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EXHIBIT

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ENGINEERING INVESTIGATION OF RAILROAD

BERM - RADNOR YARD

NASHVILLE, TENNESSEE

PREPARED FOR:

CSX TRANSPORTATION

PREPARED BY:

OGDEN

OGDEN PROJECT NO: 3-4162-3000

OCTOBER 13, 1994

**ENGINEERING INVESTIGATION OF RAILROAD**

**BERM - RADNOR YARD**

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3325 Perimeter Hill Dr.  
Nashville, TN 37211  
615 333 0630  
Fax 615 331 4715

October 13, 1994

Mr. K.W. Richardson, P.E.  
Senior Manager - Environmental  
CSX Transportation  
500 Water Street  
Jacksonville, Florida 32202

Re: Engineering Investigation of Railroad  
Berm - Radnor Yard  
Nashville, Tennessee  
Work Order No. ENV94KWR366W  
Ogden Project No. 3-4162-3000

Dear Mr. Richardson:

We have completed an engineering investigation of the berm at Radnor Yard in general accordance with our revised proposal dated August 31, 1994. Presented herewith are the data, the results of our geotechnical analyses, and our comments and recommendations.

The primary purpose of this work was to assess the stability of the berm in light of an excavation being proposed by others adjacent to the toe of the berm. The dimensions of the proposed excavation are not well defined and the extent of the excavation could impact the stability of the berm and possibly affect your active rail yard operations. Accordingly, the intent of this study was to assess the potential impact of the excavation on your track system and provide general criteria for the excavation process in order to protect your facilities.

The Association of Engineering Firms Practicing in the Geosciences has prepared important information pertaining to this and all such geotechnical studies. A copy of their published circular is included in Appendix 1 for your review.



## **BACKGROUND INFORMATION**

The subject berm is located on the east side of Radnor Yard adjacent to the SAAD Trousdale Drive (Superfund) Site in south Nashville, Davidson County, Tennessee. A general site plan is presented on the following page as Figure 1.

The berm is about 15 feet high and the east slope is steeply inclined. The toe of the slope coincides roughly with the rear property lines of the businesses along Trousdale Drive. The berm supports a network of active rail lines. A mainline track is located about 50 feet from the east edge (crest) of the berm. An active spur track (yard track) and a partial siding are located between the mainline track berm crest.

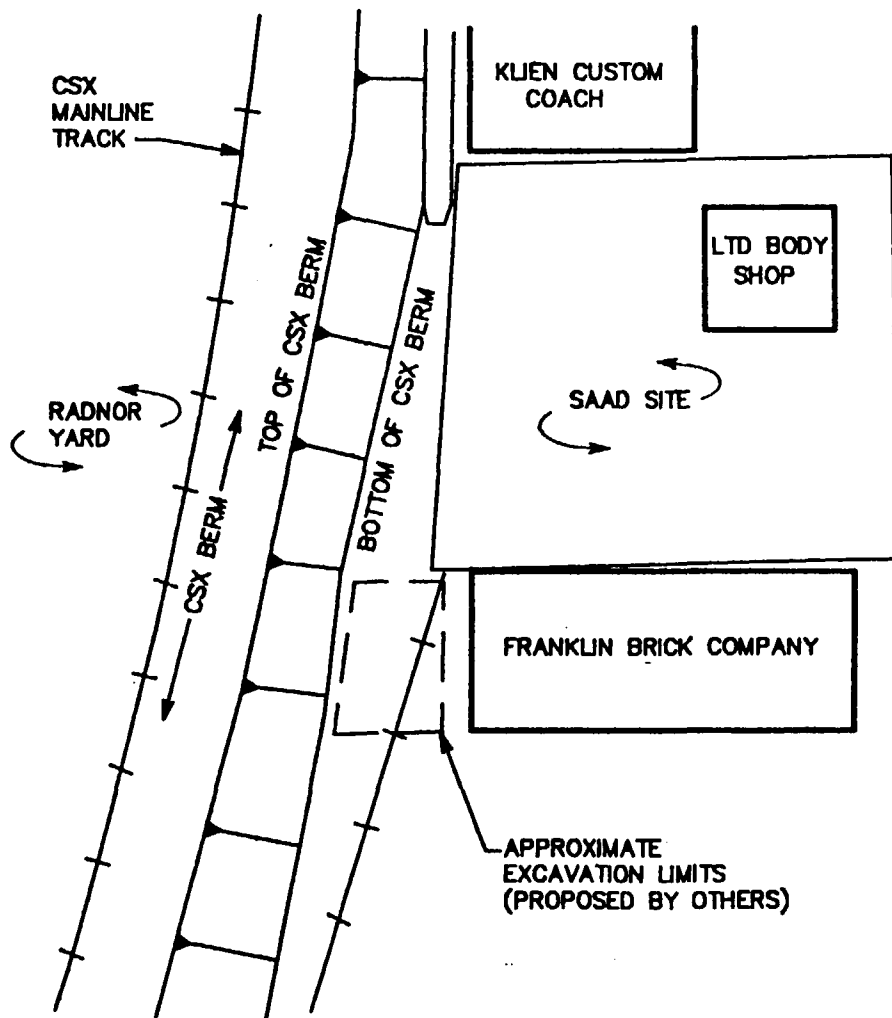
The US EPA and others intend to carry out a removal action associated with SAAD Site east of the railroad. The removal will include a general excavation behind the Franklin Brick Company Building. The excavation limits will generally extend westward toward the toe of the CSX berm.

The SAAD Site has been subject to a series of environmental investigations and removal actions beginning in 1978. The most recent action was a Phase II removal in October 1992. The investigations indicated contamination on the SAAD property was primarily limited to ethylbenzene, toluene, xylene and trichloroethene. Recent sampling indicates that total recoverable petroleum hydrocarbons (TRPH) were the most widespread site contaminants.

## **ENGINEERING PROGRAM**

### **General**

The engineering investigation was conducted in general accordance with our revised proposal dated August 31, 1994. Our work plan included: preparation and implementation of a site health and safety plan; site preparation; intrusive site drilling and sampling; laboratory testing; and, geotechnical engineering analysis. The program was tailored to assess the geotechnical aspects of the berm materials and to perform appropriate stability analyses of the berm under various excavation geometries near the berm toe.



TROUSDALE ROAD

HOOVER STREET



DATE	REVISIONS	BY
CSX TRANSPORTATION		
<b>FIGURE 1 GENERAL SITE PLAN</b>		
SCALE: 1"=60'	DESIGNED BY DLS	DRAWN BY BAV
PREPARED FOR: CSX TRANSPORTATION 800 WATER STREET JACKSONVILLE, FLORIDA		
PREPARED BY: <b>OGDEN</b> ENVIRONMENTAL AND ENERGY SERVICES 3325 PERIMETER HILL DRIVE • NASHVILLE, TN 37211 • 615-333-0030		
PROJ: 3-4162-3000-0008	DATE: 9/30/94	SHEET 1 OF 1

### Health and Safety Plan

Due to the proximity of the study area to the SAAD Site, a Health and Safety Plan (HSP) was prepared and implemented for all field activities. The HSP dictated that field activities be performed under Level D personnel protection with provisions for upgrading to Level C if conditions warranted. Air quality monitoring was performed in the work zone throughout intrusive sampling activities to detect potentially hazardous conditions. Moreover, intrusive sampling equipment was decontaminated between each boring to reduce potential cross-hole contamination if such materials were encountered. Flagging protection was provided by CSXT on a full-time basis during execution of the field work. A copy of the HSP for the project is included in Appendix 2 along with pertinent monitoring records.

### Site Preparation

Site preparation included those activities necessary to ready the site for our crews and equipment. Specifically, site preparation included the construction of a decontamination pad, limited brush clearing on the berm outslope to permit field topographic surveying, field staking initial boring locations, and coordinating with others for access to the berm shoulder and toe areas for our drill rig. Our original program included the excavation of ramps into the berm shoulder to access the toe borings from CSXT property. During our initial site visit, however, we coordinated with representatives of Franklin Brick Company to access the toe borings from Franklin Brick property. These alternate arrangements allowed us to eliminate fairly extensive clearing of the outslope and excavation of the shoulder material. Site preparation activities began on September 6, 1994, and were completed on September 7, 1994.

### Drilling and Sampling

Drilling and sampling activities were performed using an ATV rig and hollow-stem auger tools. Drilling began on September 8, 1994 and was completed on September 10, 1994. The exploratory program consisted of four (4) borings which were drilled at the locations and to the depths shown on the Drawings contained in Appendix 5. Three (3) of the borings were drive-sampled in general conformance with ASTM D 1586 to auger refusal, presumably on the bedrock surface. One boring was power augered only to refusal in order to install a monitoring well. Relatively undisturbed

Shelby tube sampling was attempted at selected intervals in each of the three sampled borings in order to yield soil specimens for laboratory analysis.

Boring 3 was equipped with a two-inch diameter, flush-mounted, stainless steel well. The well consists of a ten-foot long screen surrounded with a granular sand-pack. Above the screened interval, the annular space was sealed with a two foot thick bentonite plug and routed to the ground surface. The well tip is located at the approximate top of bedrock. Well MW-3 was developed on September 10, 1994. Immediately thereafter, others were given access to the well in order to install dye receptors for an on-going study associated with the SAAD Site. A detail of Well MW-3 is shown in Appendix 4.

Upon the completion of drilling, each sampled boring was monitored for the presence of ground water. Thereafter, each boring was backfilled full-depth with cement-bentonite grout. During drilling, auger cuttings and decontamination wash fluids were collected and covered with plastic or containerized. Disposal of these materials will be dependent upon the results of chemical laboratory testing.

In addition to the above activities, a member of Ogden's professional staff was on-site during the week of August 29, 1994 to observe drilling and sampling of one well (Well 2S) which was installed for Resource Consultant's, Inc.(RCI), by Miller Drilling Company. The location of Well 2S is also shown on the appended Plan. Installation of Well 2S was performed by RCI under separate a contract. Sampling during drilling of Well 2S was performed by hydraulically pushing a split-tube sampler into the soil subgrade at selected intervals.

As a result of presumed shallow refusal in our borings at the toe of the berm, Ogden obtained information from Mr. Christopher Greene (Tennessee Division of Superfund) regarding an open trench excavation previously made behind Franklin Brick Company. A review of that file data indicates that our augers probably refused prematurely on large boulders. That data also provided general information about subsurface conditions in the proposed excavation area and qualitative information about the stability of near-vertical trench sides in this material.



### **Field Surveying**

Field surveying was performed coincident with site preparation and drilling activities. This work included topographic mapping and location surveys of the subject berm and adjoining areas, including the rail yard west of the berm shoulder. The locations and surface elevations of each boring were determined during the field surveying process. The field survey results were used to produce the Plan drawing contained in Appendix 5.

### **Laboratory Testing**

The soil samples recovered during drilling were visually classified on-site by a member of our professional staff. The visual review categorized each sample as to probable origin (i.e., fill or natural soil), soil type, and relative consistency.

Upon completion of the drilling, the recovered samples were returned to our Nashville, Tennessee laboratory and selected specimens were identified for geotechnical laboratory testing. The testing program included natural moisture content determinations, Atterberg limits testing, grain-size distributions, specific gravity determinations, and triaxial compressive strength testing.

In addition to the geotechnical testing program, composite samples of the auger cuttings and wash fluids were obtained and shipped to our analytical laboratory in Pensacola, Florida for selected chemical constituent testing. The chemical test results will be used to determine appropriate disposal requirements for the cuttings, wash fluids, and laboratory specimens.

The results of the geotechnical and analytical laboratory tests are presented in Appendix 3. The soil specimens not consumed by testing will be retained by our laboratory until the completion of testing and will then be returned to the site for disposal, unless otherwise directed by you.

### **Geotechnical Analysis**

Based on the results of the above-described field and laboratory activities, a series of stability analyses were performed to assess the impact that the proposed excavation could have on the berm shoulder and associated railroad tracks. A more detailed

discussion of the various assumptions and excavation considerations is provided later herein.

## **SITE AND SUBSURFACE CONDITIONS**

### **Surface Features**

The subject berm is about 15 feet high and the outslope is inclined at about 1.6 horizontal (H) to 1 vertical (V). The berm forms a topographic separation between the Trousdale Drive businesses and the Radnor Yard facilities. The berm outslope is heavily vegetated with small trees and brush; the areas east and west of the berm slope are generally clear of surface vegetation.

The surface of the berm fill west of the slope supports a network of railroad tracks associated with the Radnor Yard facility. A mainline track is located about 50 feet from the top edge of the berm. An active yard track is situated about 35 feet from the top edge of the berm. An inactive, partial siding is located between the yard track and berm outslope. The rail yard area above the berm is at an average elevation of about 605 feet. The toe of the berm is at about elevation 590 feet. The Plan in Appendix 5 shows these surface features.

As might be expected, the berm surface supporting the track network is relatively flat. East of the yard track, the ground surface slopes toward the berm outslope such that surface drainage in this area is judged to be relatively good.

### **Overburden**

Our exploratory program indicates that the subsurface profile consists of random fill overlying an interval of residual soil above variably weathered bedrock. The random fill interval is 15-28 feet in thickness and consists of ballast, cinders, and boulders and cobbles intermixed with zones of silty clay. The silty clay zones appear soft to moderately firm. The underlying residual soil, formed by in-place weathering of the parent bedrock is 4 to 6 feet in thickness and consists of firm to stiff silty clay. The residuum is generally light brown and predominately classified as a CL type material according to the Unified Soil Classification System.

### **Bedrock**

Published geologic data show that the study area is underlain by the Bigby-Cannon Limestone Formation. The Bigby-Cannon Limestone is a phosphatic, cross-bedded limestone notorious for developing a highly irregular bedrock surface with numerous pinnacles and soil-filled cavities. Although bedrock was not cored as part of this study, the residual soils encountered in the borings are typical of those developed by weathering of this bedrock type.

### **Ground Water**

Ground water was encountered near the soil-bedrock contact in Borings MW-3, 3A and MW-2S (RCI Well). Water level measurements indicate that the average ground water level was at about elevation 575 feet at the time of this study. We speculate that the observed water table is perched on the top of the underlying bedrock unit. It is likely that significant fluctuations in the ground water levels occur in response to rainfall.

### **PROGRAM CONSIDERATIONS**

We understand that the proposed excavation is supposed to include removal of about 800 cubic yards of material, but that the limits and dimensions of the excavation are not well defined. Moreover, it is possible that during the excavation process, additional material may be removed along the berm toe if the US EPA identifies more widespread contamination in the excavation sidewalls. As such, the excavation could undermine the berm outslope and cause instability. Depending on the extent of undermining, stability of your active railroad tracks is of significant concern. We understand it is imperative that your mainline track not be affected by the proposed excavation activities.

### **STABILITY ASSESSMENT**

A series of stability analyses were performed on the subject berm under various excavation geometries in order to assess the potential impact on your facilities. Our goal was to identify acceptable limits and other criteria relative to the excavation process in order to protect the berm and tracks. It is extremely important to recognize that our work focuses only on the mass stability of the excavation sidewall adjacent to Radnor Yard in order to protect your tracks. It in no way pertains to general

stability of the remaining excavation sidewalls or worker safety around or within the excavation as may be required by other regulatory agencies. We presume that those responsible for authorizing the excavation will address trench stability and adjoining structure stability in accordance with applicable OSHA requirements.

Slope stability analyses were performed for four (4) situations as follows:

- Case 1 - Existing slope geometry with no excavation at toe.
- Case 2 - General, near-vertical excavation beyond berm toe extending to bedrock.
- Case 3 - Same as Case 2 except that excavation extends into berm horizontally about 15 feet.
- Case 4 - Same as Case 3 except that excavation extends an additional 25 feet into berm.

Case 1 was analyzed to confirm existing conditions and generally assess the appropriateness of selected soil strength parameters. Our analysis of this existing condition suggests that the slope has a minimum factor-of-safety of about 1.3 based on the material strength parameters we used. In our opinion, this analysis appears reasonable and the results support our selection of material strength parameters.

Based on the parameters defined or confirmed in Case 1, we performed the Case 2 analysis to assess the "typical" or likely minimum excavation configuration below the toe of the berm. Thereafter, our Case 3 and Case 4 analyses were performed in a similar manner to assess progressively larger excavations extending westward into the berm.

The analyses were conducted with the aid of a computer program to calculate slope stability factors-of-safety by a two-dimensional limiting equilibrium method for multi-layered embankments. The computer program is entitled STABL4 and was developed by C.W. Lovell, S. Sharma, and J.R. Carpenter at Purdue University and the Federal Highway Administration. In performing the analyses, we estimated shear strength parameters for the various subsurface materials and confirmed our estimates when

laboratory test data became available. The material strength parameters used in the analysis are summarized below in Table 1.

**TABLE 1**  
**SUMMARY OF ESTIMATED MATERIAL PARAMETERS**  
**CSXT RADNOR YARD BERM**

Material Type	Moist Unit Weight (pcf) $\gamma_m$	Saturated Unit Weight (pcf) $\gamma_{sat}$	Cohesion		Angle of Friction	
			Total (psf) $c$	Effective (psf) $c$	Total (deg) $\phi$	Effective (deg) $\phi$
Random Berm Fill	125	135	50	0	28	36
Residual Soil	125	130	200	0	26	28
Shotrock Fill	145	150	0	0	38	40
Weathered Bedrock	145	145	3000	1000	28	38

Except for the intermixed zones of silty clay among the boulders and cobbles, the majority of the random fill which comprises the berm material appears granular and relatively free-draining. Accordingly, material exposed along the west excavation should drain rapidly such that effective stress conditions will apply during the removal process. Moreover, our analyses indicate that effective stress conditions constitute a worse-case scenario relative to slope stability in this instance. Therefore, our analyses were performed using effective stress parameters. It is important to note, however, that total stress conditions could apply for a short period of time during the excavation process, particularly near the bottom of the excavation. As such, our computed factors-of-safety should be slightly conservative for a short-term condition.

In performing our analyses, we included surcharge loads atop the berm to model locomotive and car loads on the yard track and mainline. The yard track load was modeled as a uniformly distributed load of 1.5 ksf; the mainline track was modeling with a 2.0 ksf uniformly distributed load.

### Discussion of Results

The results of our analyses for Cases 1-4 are presented graphically on Sheets 2 and 3 of the appended drawings. Table 2 below summarizes the results:

**TABLE 2**  
**SUMMARY OF STABILITY ANALYSIS RESULTS**  
**CSXT RADNOR YARD BERM**

Case	Computed Minimum Factor-Of-Safety (F.S.)	Computed F.S. for Mass Stability and Protection of Tracks	Comments
Case 1	1.3	1.6	Confirms existing conditions.
Case 2	0.4	1.3	Shows top portion of near-vertical bank in berm is unstable but should not affect tracks provided berm not undermined.
Case 3	0.5	1.2	Shows top portion of near-vertical bank in berm is unstable and yard-track (spur) is only marginally stable. Mainline track should be stable provided excavation limited to that shown.
Case 4	1.2	1.4	Shows upper berm material may ravel into near-vertical cut and yard-track (spur) should be taken out of service. Excavation sidewall may need to be buttressed with rockfill immediately after cut and excavation should progress sequentially across site.

The stability analysis results generally show that any near-vertical excavation below the berm toe or into the berm outslope could cause instability and ravelling of the material along the upper portion of the excavation sidewall. This is due primarily to the steepness of the trench side and the granular nature of the random fill material. We expect that such ravelling action will occur quickly during the excavation process and will continue until the slope regrades itself to a marginally stable configuration. The heterogeneous nature of the berm material will significantly influence the rate and extent of ravelling depending on the size and quantity of boulders, cobbles, and soil zones dispersed throughout the fill.

Case 2 shows that a typical, minimum excavation below the berm toe will likely affect the outer portion of the berm slope, but that the yard track (spur) and mainline track should remain stable provided the excavation does not extend into or beyond

the berm toe. We presume that some ravelling or sloughing of the berm outslope is acceptable provided it does not progress into the berm shoulder. It should be noted, however, that the communications line along the berm could be affected by this condition.

Case 3 shows that an excavation extending about 15 feet into the berm could impact the site in a manner similar to Case 2 except that the ravelling could extend further into the berm shoulder. Specifically, Case 3 indicates that the yard-track (spur) would be only marginally stable and should be taken out-of-service under this excavation scenario. Provided the excavation limits do not exceed those indicated, we judge that the mainline track will remain stable and operable.

Case 4 takes Case 3 a step further with regard to extending the excavation into the berm. Specifically, Case 4 indicates that it may be possible to extend the excavation up to 25 feet into the berm while maintaining stability of the mainline track provided that mass conditions are better than those assumed or that the excavation sidewall is immediately buttressed with shotrock fill. If conditions are equal to or worse than assumed, and a carefully planned excavation sequence is not followed, we estimate that undermining the berm beyond Case 3 could impact the mainline track.

We presume that the Case 4 excavation scenario described above and shown on Sheet 3 of the Drawings constitutes an extreme condition with regard to the extent of the removal action envisioned by the US EPA under a normal planned excavation process. Although not expected, it is foreseeable that others may wish to extend the excavation further into the berm toward the mainline track. In that instance, we believe that any excavation beyond that shown by Case 4 will require a positive type earth retaining system to maintain stability of the excavation sideslope and the mainline. Sheet 3 of the appended Drawings shows schematic diagrams of two such retaining systems which may serve this purpose. Schematic A shows a Type A Insert Wall which generally consists of a concrete slab-on-grade supported by a network of closely spaced pipe piles. The pile network includes tension and compression members and the close pile spacing is intended to interlock and pin together the subgrade material. Construction of this type of system at the site would probably cost on the order of \$150,000. Schematic B shows a typical soldier pile

and lagging retaining wall with tie-back anchors. This system would likely consist of steel H-piles on a 4-8 foot spacing with timber or concrete lagging between piles. The lagging and tie-back anchors would be installed as the excavation progresses downward such that wall construction is essentially performed in a top-down fashion. This type of system would probably cost on the order of \$130,000.

As noted above, the need for such an extensive retaining system is not envisioned at this time and the design of such a system is beyond the scope of this study. However, in the event that such a system becomes necessary, Table 3 provides a summary of pertinent geotechnical design parameters.

**TABLE 3**  
**SUMMARY OF GEOTECHNICAL DESIGN PARAMETERS**

PARAMETERS	RECOMMENDED DESIGN VALUES
Unit Weight - Dry	97.3 PCF ++
Unit Weight - Moist	122.4 PCF ++
Unit Weight - Saturated	127.4 PCF ++
Specific Gravity	2.61 ++
Liquid Limit	43 ++
Plasticity Index	23 ++
Natural Moisture Content	25.1 ++
Unified Soil Classification	CL
Adhesions - Soil to Concrete/Rock	200.0 PSF +
Cohesion - Total Stress	200.0 PSF +
Angle of Internal Friction - Total Stress	26° +
Cohesion - Effective Stress	0.0 PSF +
Angle of Internal Friction - Effective Stress	28° +
Average Depth of Bedrock Weathering	10 feet +
Grout-to-Rock Design Bond Strength	90 PSI +
Bedrock Unit Weight	145.0 PCF +

++ Average Value

+ Estimated Value



## **COMMENTS AND RECOMMENDATIONS**

Based on the preceding data and analyses, it appears that any large excavation behind the Franklin Brick Company could potentially cause instability of the berm outslope and shoulder material. If the excavation is confined to the area beyond the berm toe, we expect that minor ravelling and sloughing of the existing slope material is possible. Such a condition should not impact your rail yard facilities other than possibly the communications line which traverses the berm shoulder. If the excavation progresses into the berm toe, we expect that ravelling and general sideslope instability will likewise progress further into the berm and could begin to encroach on your track facilities. Once the berm toe is undercut, stability of the yard track becomes marginal and it may need to be taken out of service. As additional undercutting occurs, stability of the mainline track could be affected and sequential excavation and backfilling techniques may be warranted, as suggested by Case 4, to maintain stability. In order to better assess stability of the berm shoulder and the permissible extent of the excavation, mass conditions should be reviewed in the field as they are exposed. As such, we recommend that all excavation activities be closely observed by a qualified geotechnical engineer. CSXT should provide 24-hour flag protection throughout the excavation process in the event that the tracks are affected. Moreover, prior to the start of excavation, we recommend that a series of concrete surface monuments be installed along the berm slope and shoulder areas. These monuments should be periodically surveyed during the excavation process in an attempt to detect slope movements which could encroach on the track system.

We recommend that the proposed excavation not be permitted to extend into the berm more than about 10-15 feet (i.e., Case 3 situation). If on-site personnel wish to extend the excavation further into the berm, we recommend that an assessment of mass conditions be made at that time and that appropriate criteria be established by qualified personnel under which to follow in performing the work. Under no circumstances do we recommend that the excavation be permitted to progress further than that shown by Case 4 without first designing and installing a positive earth retaining system to protect the mainline track.

It is important to recognize that the above recommendations pertain only to issues related to mass stability of the berm outslope and track system. They do not address

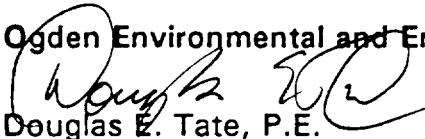
general trench excavation stability; protection of other structures near the excavation; or worker safety issues. We presume that those responsible for the proposed excavation will address such concerns and be on-site during the work to enforce construction safety practices.

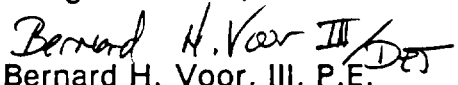
### CLOSURE

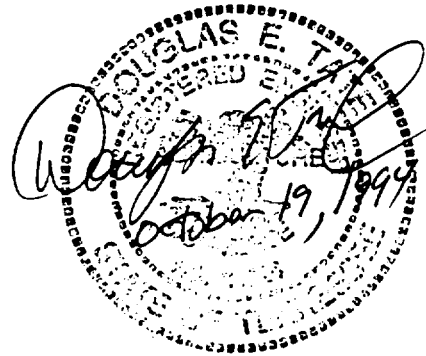
We appreciate this opportunity to be of service to CSX Transportation on this project and we look forward to assisting you with the necessary field engineering services during the excavation process. We are available at your convenience to meet to discuss the details of this report. In the meantime, if you have any questions, please call us at (615) 333-0630.

Respectfully submitted,

Ogden Environmental and Energy Services Co., Inc.

  
Douglas E. Tate, P.E.

  
Bernard H. Voor, III, P.E.



**APPENDIX 1**  
**ASFE INFORMATION CIRCULAR**

## IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

As the client of a consulting geotechnical engineer, you should know that site subsurface conditions cause more construction problems than any other factor. ASFE/The Association of Engineering Firms Practicing in the Geosciences offers the following suggestions and observations to help you manage your risks.

### A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

Your geotechnical engineering report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. These factors typically include: the general nature of the structure involved, its size, and configuration; the location of the structure on the site; other improvements, such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask your geotechnical engineer to evaluate how factors that change subsequent to the date of the report may affect the report's recommendations.

Unless your geotechnical engineer indicates otherwise, do not use your geotechnical engineering report:

- when the nature of the proposed structure is changed, for example, if an office building will be erected instead of a parking garage, or a refrigerated warehouse will be built instead of an unrefrigerated one;
- when the size, elevation, or configuration of the proposed structure is altered;
- when the location or orientation of the proposed structure is modified;
- when there is a change of ownership; or
- for application to an adjacent site.

Geotechnical engineers cannot accept responsibility for problems that may occur if they are not consulted after factors considered in their report's development have changed.

### SUBSURFACE CONDITIONS CAN CHANGE

A geotechnical engineering report is based on conditions that existed at the time of subsurface exploration. Do not base construction decisions on a geotechnical engineering report whose adequacy may have been affected by time. Speak with your geotechnical consultant to learn if additional tests are advisable before construction starts. Note, too, that additional tests may be required when subsurface conditions are affected by construction operations at or adjacent to the site, or by natural events such as floods, earthquakes, or ground water fluctuations. Keep your geotechnical consultant apprised of any such events.

### MOST GEOTECHNICAL FINDINGS ARE PROFESSIONAL JUDGMENTS

Site exploration identifies actual subsurface conditions only at those points where samples are taken. The data were extrapolated by your geotechnical engineer who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your geotechnical engineer can work together to help minimize their impact. Retaining your geotechnical engineer to observe construction can be particularly beneficial in this respect.

### A REPORT'S RECOMMENDATIONS CAN ONLY BE PRELIMINARY

The construction recommendations included in your geotechnical engineer's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Because actual subsurface conditions can be discerned only during earthwork, you should retain your geotechnical engineer to observe actual conditions and to finalize recommendations. Only the geotechnical engineer who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations are valid and whether or not the contractor is abiding by applicable recommendations. The geotechnical engineer who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

### GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Consulting geotechnical engineers prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your geotechnical engineer prepared your report expressly for you and expressly for purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the geotechnical engineer. No party should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.

### GEOENVIRONMENTAL CONCERNS ARE NOT AT ISSUE

Your geotechnical engineering report is not likely to relate any findings, conclusions, or recommendations

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**APPENDIX 2**  
**COPY OF HEALTH AND SAFETY PLAN**

**HEALTH AND SAFETY PLAN  
ENGINEERING INVESTIGATION OF  
RAILROAD EMBANKMENT (BERM)  
RADNOR YARD  
NASHVILLE, DAVIDSON COUNTY, TENNESSEE**

**PREPARED FOR:**

**CSX TRANSPORTATION  
500 WATER STREET  
JACKSONVILLE, FLORIDA**

**PREPARED BY:**

**OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
3325 PERIMETER HILL DRIVE  
NASHVILLE, TENNESSEE 37211**

**SEPTEMBER 2, 1994**

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**APPENDICES****NUMBER**

<b>1</b>	<b>MATERIAL SAFETY DATA SHEETS</b>
<b>2</b>	<b>CSX TRANSPORTATION - ENVIRONMENTAL DEPARTMENT, SAFETY RULES AND PROCEDURES WHILE ON CSX PROPERTY</b>
<b>3</b>	<b>FORMS</b>



## GENERAL INFORMATION:

- Site Name & Location:  
CSX Transportation  
Radnor Yard Berm  
Nashville, Tennessee
- Site Contact and Telephone:  
Mr. Mike Duke  
Project Engineer  
Radnor Yard  
(615) 664-2903
- Alternate Site Contact:  
Mr. Tom Thoburn  
Division Engineer  
Radnor Yard  
(615) 664-2902
- Client Contact and Telephone:  
Mr. Ken Richardson  
Senior Manager - Environmental  
Jacksonville, Florida  
(904) 359-1590
- Ogden Project Manager:  
Mr. Bernie Voor  
Project Manager  
Nashville, Tennessee  
(615) 333-0630 213
- Ogden Site Health and Safety Officer:  
TBA  
Site H & S Officer  
Nashville, Tennessee  
(615) 333-0630
- Ogden Health and Safety Coordinator  
Marcella Walsh  
Nashville, Tennessee  
(615) 333-0630 266

## SITE DESCRIPTION AND FEATURES:

The subject berm is located on the east side of Radnor Yard adjacent to the SAAD Trousdale Drive (Superfund) Site in South Nashville, Davidson County, Tennessee. A general site plan is presented in Figure 1.

The berm is about 20 feet high and the east slope is steeply inclined at about 1 unit horizontal (H) to 1 unit vertical (V). The toe of the east slope coincides roughly with the rear property

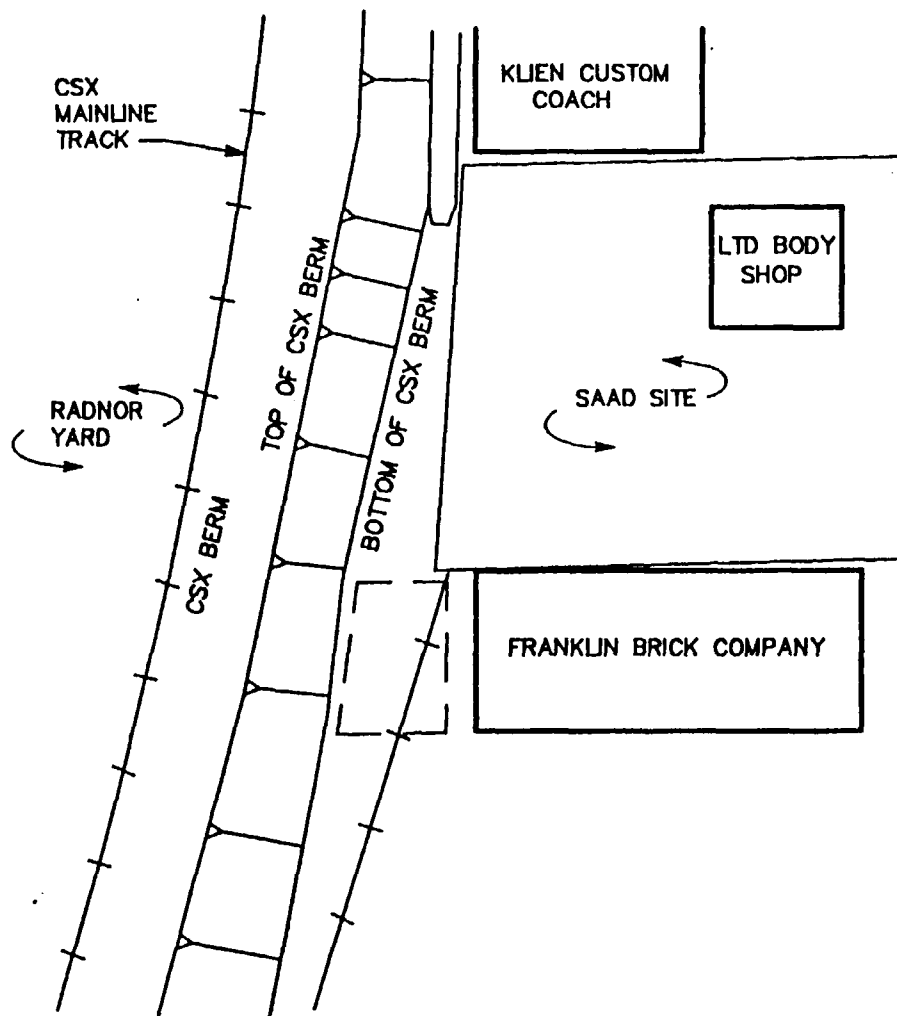
lines of the businesses along Trousdale Drive. The berm supports a network of active rail lines. A mainline track is located about 30 feet from the east edge of the berm. An active spur track and a partial siding are located between the mainline and berm edge.

To ensure a safe and healthy work environment, all rules listed in "CSX Transportation - Environmental Department, Safety Rules and Procedures while on CSX Property" must be complied with. A copy is in Appendix 2.

#### **BACKGROUND/SITE HISTORY:**

The SAAD Site has been subject to a series of environmental investigations and removal actions beginning in 1978. The most recent action was a Phase II removal in October 1992. The investigations indicated contamination on the SAAD property was primarily limited to ethylbenzene, toluene, xylene, and trichloroethene. Recent sampling indicates that total recoverable petroleum hydrocarbons (TRPH) were the most widespread contaminant.

TRPH values obtained from the SAAD RA/FI Phase II investigation and the Phase I report for Oil Pollution Abatement at Radnor Yard of CSX Transportation, Inc., May 1991, were evaluated by DRE to determine the location and extent of TRPH contamination and possible source areas. The DRE report stated analytical data indicates that the soils on the SAAD Site and CSX are contaminated with TRPH. TRPH concentrations between 1.5-5 feet below ground ranged from 390 ppm to 46,900 ppm in the lube storage area on Radnor Yard and the western edge of the SAAD site. TRPH concentrations between 10 and 15 feet belowground ranged from 270 ppm to 11,400 ppm.



TROUSDALE ROAD

HOOVER STREET



DATE	REVISIONS	BY
CSX TRANSPORTATION NSD		
<b>FIGURE 1</b>		
<b>GENERAL SITE PLAN</b>		
SCALE: 1"=60'	DR DLS	DR
PREPARED FOR: CSX TRANSPORTATION 500 WATER STREET JACKSONVILLE, TENNESSEE		
PREPARED BY:		
<b>OGDEN</b> ENVIRONMENTAL AND ENERGY SERVICES		
3325 PERIMETER HILL DRIVE • NASHVILLE, TN 37211 • 615-333-0630		
PROJ: 3-4182-3000-0001	DATE: 8/31/94	SHEET 1 OF 1

SITE PLAN

28 1562

## SCOPE OF WORK/PLANNED SITE ACTIVITIES

Ogden Environmental and Energy Services (Ogden) will conduct a geotechnical investigation of the berm adjacent to the proposed SAAD site excavation. It is anticipated that the project will run for a duration of approximately one week. Planned site activities include the following tasks, listed in the sequence of occurrence.

1. Site Preparation: Clearing and disposing of surface vegetation on the berm slope in the locations of the borings.
2. Site Preparation: Prepare ramps down the outslope to the proposed boring locations near the berm toe utilizing a rubber-tired Grad-all excavator.
3. Drilling of boring holes and collection of soil samples.
4. Installation and development of monitoring well.
5. Sampling and heavy equipment decontamination using a (steam cleaner) and a process of (detergent wash, water rinse, solvent rinse, water rinse, and deionized water rinse).
6. Management of investigation - derived waste.
7. Field survey.

We understand that CSXT will provide full-time flag protection at Ogden's schedule throughout the site preparation and field investigation activities.

## SITE PERSONNEL AND NOTIFICATION REQUIREMENTS

1. Ogden Drill Crew - 3 person - TBD
2. Ogden Site Health and Safety Officer - TBD
3. Ogden Field Survey Crew - 3 person - TBD
4. Mr. Christopher E. Greene, TN Superfund, (615) 741-7391
5. Mr. Nick Crawford, USEPA Consultant, (502) 843-4979
6. Mr. Mike Duke - CSXT, Project Engineer, (615) 664-2903

WASTE CHARACTERISTICS:

WASTE TYPES: (Check all that apply)

<input checked="" type="checkbox"/> Liquid	<input type="checkbox"/> Sludge	<input type="checkbox"/> Unknown
<input checked="" type="checkbox"/> Solid	<input type="checkbox"/> Gas	

WASTE CHARACTERISTICS: (Check all that apply)

<input type="checkbox"/> Corrosive	<input checked="" type="checkbox"/> Flammable	<input type="checkbox"/> Radioactive
<input type="checkbox"/> Toxic	<input checked="" type="checkbox"/> Volatile	<input type="checkbox"/> Reactive
<input type="checkbox"/> Inert	<input checked="" type="checkbox"/> Carcinogenic	<input type="checkbox"/> Unknown

HAZARDOUS MATERIALS SUMMARY (Check all that apply)

Chemicals

<input type="checkbox"/> Acids	<input type="checkbox"/> Metals	<input type="checkbox"/> Phenols
<input type="checkbox"/> Caustics	<input type="checkbox"/> Pesticides	<input type="checkbox"/> Paints
<input type="checkbox"/> Halogen	<input type="checkbox"/> PCBs	<input checked="" type="checkbox"/> Solvents
<input type="checkbox"/> Other: _____		

Oils/Fuels

<input type="checkbox"/> Fuel oil	<input type="checkbox"/> AVGAS	<input type="checkbox"/> MOGAS
<input checked="" type="checkbox"/> Other: <u>High total removable petroleum hydrocarbons identified on adjacent site and subject property</u>		

Sludges

<input type="checkbox"/> Metal sludges	<input type="checkbox"/> Oily sludges	<input type="checkbox"/> Septic sludges
<input type="checkbox"/> Other: _____		

Solids

<input type="checkbox"/> Asbestos	<input type="checkbox"/> Landfill refuse	<input type="checkbox"/> Tailings
<input type="checkbox"/> Other: _____		

NOTES: Chemicals of concern include ethylbenzene, toluene, xylene, trichloroethylene, and diesel

**HAZARD ASSESSMENT:**

**HAZARD ANALYSIS OF SITE WORK TASKS:**

**Task Name:** Site Preparation: Mobilization and general site setup.

**Potential Hazards:** (Check all that apply to either existing conditions or are a result of site operations)

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Routing Machinery          | <input type="checkbox"/> Projectiles                        | <input type="checkbox"/> Confined Space                    |
| <input checked="" type="checkbox"/> Heat Stress     | <input checked="" type="checkbox"/> Physical Exertion       | <input type="checkbox"/> Biological                        |
| <input type="checkbox"/> Cold Stress                | <input checked="" type="checkbox"/> Noise (>85 dBA)         | <input checked="" type="checkbox"/> Electrical (utilities) |
| <input checked="" type="checkbox"/> Heavy Equipment | <input checked="" type="checkbox"/> Vehicle Traffic         | <input checked="" type="checkbox"/> Chemical Exposure      |
| <input type="checkbox"/> Intrusive Activ's (Circle) | <input checked="" type="checkbox"/> Fire Explosion (Circle) |  |
| • Drilling  | • Flam/materials  |  |
| • Soil Vapor Survey                                 | • Low lying Areas   |  |
| • Cone Petrom. Survey                               | • Fuel lines  |  |
| • Sampling  |   |  |
| <input checked="" type="checkbox"/> Other (List)    |   |  |

Slips, trips and falls. Contact with contaminated soil. Active rail lines.

**Control or Protective Measures:** (Check all that apply)

- |  |  |   |
|--|--|---|
| <input checked="" type="checkbox"/> Tailgate Meetings  | <input checked="" type="checkbox"/> PPE, Level D | <input checked="" type="checkbox"/> Safe Work Practices |
| <input checked="" type="checkbox"/> Operator Training  | <input checked="" type="checkbox"/> Site Control | <input checked="" type="checkbox"/> Decontamination     |
| <input type="checkbox"/> Engineering Controls: _____   |  |   |
| <input checked="" type="checkbox"/> SOP's: Heat Stress Prevention (HS-2), Hearing Conservation (HS-5). |  |   |
| <input checked="" type="checkbox"/> Other: CSX Safety Rules (Appendix 2).                              |  |   |

**Task Name:** Site Preparation: Prepare ramp utilizing rubber tired Grad - all excavator.

**Potential Hazards:** (Check all that apply to either existing conditions or are a result of site operations)

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Routing Machinery                     | <input type="checkbox"/> Projectiles                        | <input type="checkbox"/> Confined Space                    |
| <input checked="" type="checkbox"/> Heat Stress                | <input checked="" type="checkbox"/> Physical Exertion       | <input type="checkbox"/> Biological                        |
| <input type="checkbox"/> Cold Stress                           | <input checked="" type="checkbox"/> Noise (>85 dBA)         | <input checked="" type="checkbox"/> Electrical (utilities) |
| <input checked="" type="checkbox"/> Heavy Equipment            | <input checked="" type="checkbox"/> Vehicle Traffic         | <input checked="" type="checkbox"/> Chemical Exposure      |
| <input checked="" type="checkbox"/> Intrusive Activ's (Circle) | <input checked="" type="checkbox"/> Fire Explosion (Circle) |  |
| • Drilling   | • Flam/materials  |  |
| • Soil Vapor Survey  | • Low lying Areas   |  |
| • Cone Petrom. Survey  | • Fuel lines  |  |
| • Sampling   |   |  |
| <input checked="" type="checkbox"/> Other (List)               |   |  |

CSX train activity, slips, trips, and fall

**Control or Protective Measures:** (Check all that apply)

- |  |  |   |
|--|--|---|
| <input checked="" type="checkbox"/> Tailgate Meetings  | <input checked="" type="checkbox"/> PPE, Level D | <input checked="" type="checkbox"/> Safe Work Practices |
| <input checked="" type="checkbox"/> Operator Training  | <input checked="" type="checkbox"/> Site Control | <input checked="" type="checkbox"/> Decontamination     |
| <input checked="" type="checkbox"/> Engineering Controls: Dust suppression techniques, if required.          |  |   |
| <input checked="" type="checkbox"/> SOP's: Heat Stress Prevention (HS-2), Hearing Conservation (HS-5)        |  |   |
| <input checked="" type="checkbox"/> Other: CSX Safety Rules (Appendix 2). Maintain a supply of cool liquids. |  |   |

**Task Name: Drilling of boring holes and collection of soil samples.**

**Potential Hazards:** (Check all that apply to either existing conditions or are a result of site operations)

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Routing Machinery                     | <input type="checkbox"/> Projectiles                        | <input type="checkbox"/> Confined Space                    |
| <input checked="" type="checkbox"/> Heat Stress                | <input checked="" type="checkbox"/> Physical Exertion       | <input type="checkbox"/> Biological                        |
| <input type="checkbox"/> Cold Stress                           | <input checked="" type="checkbox"/> Noise (> 85 dBA)        | <input checked="" type="checkbox"/> Electrical (utilities) |
| <input checked="" type="checkbox"/> Heavy Equipment            | <input checked="" type="checkbox"/> Vehicle Traffic         | <input checked="" type="checkbox"/> Chemical Exposure      |
| <input checked="" type="checkbox"/> Intrusive Activ's (Circle) | <input checked="" type="checkbox"/> Fire Explosion (Circle) |  |
| <input checked="" type="checkbox"/> Drilling                   | <input checked="" type="checkbox"/> Flam/materials          |  |
| • Soil Vapor Survey  | • Low lying Areas   |  |
| • Cone Petrom. Survey  | • Fuel lines  |  |
| • Sampling   |   |  |
| <input checked="" type="checkbox"/> Other (List)               |   |  |

Slips, trips and falls. Contact with contaminated soil. Active rail lines.

**Control or Protective Measures:** (Check all that apply)

- |   |  |   |
|---|--|---|
| <input checked="" type="checkbox"/> Tailgate Meetings   | <input checked="" type="checkbox"/> PPE, Level D | <input checked="" type="checkbox"/> Safe Work Practices |
| <input checked="" type="checkbox"/> Operator Training   | <input checked="" type="checkbox"/> Site Control | <input checked="" type="checkbox"/> Decontamination     |
| <input checked="" type="checkbox"/> Engineering Controls: <u>Dust suppression techniques, utility survey prior to intrusive activities. Located overhead lines prior to moving rig.</u> |  |   |
| <input checked="" type="checkbox"/> SOP's: <u>Heat Stress Prevention (HS-2), Decontamination (HS-10)</u>  |  |   |
| <input checked="" type="checkbox"/> Other: <u>Maintain a supply of cool liquids. Follow CSX Safety Rules in Appendix 2.</u>   |  |   |

**Task Name: Installation and Development of Monitoring Wells**

**Potential Hazards:** (Check all that apply to either existing or are a result of site operations)

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Routing Machinery                     | <input type="checkbox"/> Projectiles                  | <input type="checkbox"/> Confined Space                    |
| <input checked="" type="checkbox"/> Heat Stress                | <input checked="" type="checkbox"/> Physical Exertion | <input type="checkbox"/> Biological                        |
| <input type="checkbox"/> Cold Stress                           | <input checked="" type="checkbox"/> Noise (> 85 DBA)  | <input checked="" type="checkbox"/> Electrical (utilities) |
| <input checked="" type="checkbox"/> Heavy Equipment            | <input checked="" type="checkbox"/> Vehicle Traffic   | <input checked="" type="checkbox"/> Chemical Exposure      |
| <input checked="" type="checkbox"/> Intrusive Activ's (Circle) | <input type="checkbox"/> Fire Explosion (Circle)      |  |
| • Drilling   | • Flam/materials                                      |  |
| • Soil Vapor Survey  | • Low lying Areas                                     |  |
| • Cone Petrom. Survey  | • Fuel lines  |  |
| • Sampling   |   |  |
| <input checked="" type="checkbox"/> Other (List)               |   |  |

CSX train activities. Slips, trips, and falls. Contact with contaminated soil.

**Control or Protective Measures:** (Check all that apply)

- |   |  |   |
|---|--|---|
| <input checked="" type="checkbox"/> Tailgate Meetings   | <input checked="" type="checkbox"/> PPE, Level D | <input checked="" type="checkbox"/> Safe Work Practices |
| <input checked="" type="checkbox"/> Operator Training   | <input checked="" type="checkbox"/> Site Control | <input checked="" type="checkbox"/> Decontamination     |
| <input type="checkbox"/> Engineering Controls: _____  |  |   |
| <input checked="" type="checkbox"/> SOP's: <u>Heat Stress Prevention (HS-2), Decontamination (HS-5)</u> |  |   |
| <input checked="" type="checkbox"/> Other: <u>CSX Safety Rules (Appendix 2)</u>                         |  |   |

**Task Name: Management of Investigation Derived Waste**

Potential Hazards: (Check all that apply to either existing or are a result of site operations)

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Routing Machinery                     | <input type="checkbox"/> Projectiles                        | <input type="checkbox"/> Confined Space                    |
| <input checked="" type="checkbox"/> Heat Stress                | <input type="checkbox"/> Physical Exertion                  | <input type="checkbox"/> Biological                        |
| <input type="checkbox"/> Cold Stress                           | <input checked="" type="checkbox"/> Noise (>85 DBA)         | <input checked="" type="checkbox"/> Electrical (utilities) |
| <input checked="" type="checkbox"/> Heavy Equipment            | <input checked="" type="checkbox"/> Vehicle Traffic         | <input checked="" type="checkbox"/> Chemical Exposure      |
| <input checked="" type="checkbox"/> Intrusive Activ's (Circle) | <input checked="" type="checkbox"/> Fire Explosion (Circle) |  |
| • Drilling   | • Flam/materials  |  |
| • Soil Vapor Survey  | • Low lying Areas   |  |
| • Cone Petrom. Survey  | • Fuel lines  |  |
| • Sampling   |   |  |
| <input checked="" type="checkbox"/> Other (List)               |   |  |

Slips, trips, and falls. Active rail lines.

Control or Protective Measures: (Check all that apply)

- |   |  |   |
|---|--|---|
| <input checked="" type="checkbox"/> Tailgate Meetings   | <input checked="" type="checkbox"/> PPE, Level D | <input checked="" type="checkbox"/> Safe Work Practices |
| <input checked="" type="checkbox"/> Operator Training   | <input checked="" type="checkbox"/> Site Control | <input checked="" type="checkbox"/> Decontamination     |
| <input type="checkbox"/> Engineering Controls:  |  |   |
| <input checked="" type="checkbox"/> SOP's: <u>Heat Stress Prevention (HS-2)</u>                                     |  |   |
| <input checked="" type="checkbox"/> Other: <u>CSX Safety Rules (Appendix 2). Maintain a supply of cool liquids.</u> |  |   |

**Task Name: Sampling and Equipment Decontamination**

Potential Hazards: (Check all that apply to either existing or are a result of site operations)

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Routing Machinery          | <input type="checkbox"/> Projectiles                             | <input type="checkbox"/> Confined Space                    |
| <input checked="" type="checkbox"/> Heat Stress     | <input checked="" type="checkbox"/> Physical Exertion            | <input type="checkbox"/> Biological                        |
| <input type="checkbox"/> Cold Stress                | <input checked="" type="checkbox"/> Noise (>85 DBA)(steam clean) | <input checked="" type="checkbox"/> Electrical (utilities) |
| <input checked="" type="checkbox"/> Heavy Equipment | <input checked="" type="checkbox"/> Vehicle Traffic              | <input checked="" type="checkbox"/> Chemical Exposure      |
| <input type="checkbox"/> Intrusive Activ's (Circle) | <input checked="" type="checkbox"/> Fire Explosion (Circle)      |  |
| • Drilling  | • Flam/materials   |  |
| • Soil Vapor Survey                                 | • Low lying Areas  |  |
| • Cone Petrom. Survey                               | • Fuel lines   |  |
| • Sampling  |  |  |
| <input checked="" type="checkbox"/> Other (List)    |  |  |

Slips, trips, and falls. Back stress: Steam burns.

Control or Protective Measures: (Check all that apply)

- |  |  |   |
|--|--|---|
| <input checked="" type="checkbox"/> Tailgate Meetings  | <input checked="" type="checkbox"/> PPE, Level D | <input checked="" type="checkbox"/> Safe Work Practices |
| <input checked="" type="checkbox"/> Operator Training(steam clean)   | <input checked="" type="checkbox"/> Site Control | <input checked="" type="checkbox"/> Decontamination     |
| <input checked="" type="checkbox"/> Engineering Controls: <u>Elevated decon containers to reduce back stress.</u>                    |  |   |
| <input checked="" type="checkbox"/> SOP's: <u>Heat Stress Prevention (HS-2), Decontamination (HS-6), Hearing Conservation (HS-5)</u> |  |   |
| <input checked="" type="checkbox"/> Other: <u>CSX Safety Rules (Appendix 2). Maintain a supply of cool liquids.</u>                  |  |   |

Contain splash and overspray from steam cleaning operations; point steam cleaner away from self and nearby personnel; limit use to working hours. Maintain supply of cool liquids; stay upwind while applying solvent rinse during equipment decontamination; rotate task among personnel to reduce heat stress potential.



OGDEN  
CSX Transportation  
Radnor Yard, Nashville, Tennessee

Engineering Investigation  
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**Task Name: Field Survey**

**Potential Hazards:** (Check all that apply to either existing or are a result of site operations)

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Routing Machinery          | <input type="checkbox"/> Projectiles                              | <input type="checkbox"/> Confined Space         |
| <input checked="" type="checkbox"/> Heat Stress     | <input checked="" type="checkbox"/> Physical Exertion             | <input type="checkbox"/> Biological             |
| <input type="checkbox"/> Cold Stress                | <input checked="" type="checkbox"/> Noise (> 85 DBA)(steam clean) | <input type="checkbox"/> Electrical (utilities) |
| <input checked="" type="checkbox"/> Heavy Equipment | <input checked="" type="checkbox"/> Vehicle Traffic               | <input type="checkbox"/> Chemical Exposure      |
| <input type="checkbox"/> Intrusive Activ's (Circle) | <input type="checkbox"/> Fire Explosion (Circle)                  |   |
| • Drilling  | • Flam/materials  |   |
| • Soil Vapor Survey                                 | • Low lying Areas   |   |
| • Cone Petrom. Survey                               | • Fuel lines  |   |
| • Sampling  |   |   |
| <input checked="" type="checkbox"/> Other (List)    |   |   |

Slips, trips, and falls. Contact with contaminated soil. Radnor Yard activities.

**Control or Protective Measures:** (Check all that apply)

- |   |  |   |
|---|--|---|
| <input checked="" type="checkbox"/> Tailgate Meetings   | <input checked="" type="checkbox"/> PPE, Level D | <input checked="" type="checkbox"/> Safe Work Practices |
| <input type="checkbox"/> Operator Training  | <input checked="" type="checkbox"/> Site Control | <input type="checkbox"/> Decontamination                |
| <input type="checkbox"/> Engineering Controls:  |  |   |
| <input checked="" type="checkbox"/> SOP's: <u>Heat Stress Prevention (HS-2), Hearing Conservation (HS-5)</u>        |  |   |
| <input checked="" type="checkbox"/> Other: <u>Maintain a supply of cool liquids. CSX Safety Rules (Appendix 2).</u> |  |   |

## HEAT STRESS PREVENTION:

### Control Measures:

- One day of acclimatization, light duty only, if feasible
- Daily consumption of approximately 1-2 gallons of water electrolyte solutions (body weight loss due to perspiration should not exceed 1.5% of total body weight per work shift),
- Workers must go through decon before entering clean areas for breaks.
- Personnel monitoring for heat stress or illness as warranted by the on-site health and safety coordinator. If heat related concerns exist, count the radial pulse during a 30-second period as early as possible in the rest period. If the heart rate exceeds 100 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same. If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.

### Recognition of heat illness:

- Heat cramps - muscle spasms during or after work shift
- Heat exhaustion - fatigue, clammy skin, nausea, profuse sweating
- Heat stroke - confusion, hot dry skin, absence of sweating (life threatening)

### General First Aid:

- Provide emergency decontamination, remove to cool areas, provide cool fluids (only if conscious), and immediately reduce body temperature. Seek medical advise.

For further information consult the Corporate Health and Safety Program Manual, which contains information on first aid and the Bloodborne Pathogen Program.

### UNUSUAL OR SPECIAL HAZARDS: (For ex., lightning, tornado, and earthquakes)

Lightning: work will cease if lightning is observed.  
Active Railyard: Obey CSXT Safety Rules.

### CHEMICAL HAZARDS:

The attached table summarizes the physical, chemical and toxicological data of key hazardous materials identified at the study site.

### NOTES:

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**TABLE 1**  
**CHEMICAL HAZARD ASSESSMENT OF IDENTIFIED KEY COMPOUNDS**

Substance Name	Exposure Limits mg/M <sup>3</sup>		Physical Data mg/M <sup>3</sup>			Health Effects		
	ACGIH TLV	OSHA PEL/ STEL/ CEILING	NIOSH REL	IDLH (ppm)	LEL/UEL	Exposure Route	Symptoms	Target Organ
Ethylbenzene	100 ppm	100 ppm/125 ppm	100 ppm	2,000	1.0%/6.7%	Inh Ing Con	Irritation of eyes, mucous membrane, headaches, dermatitis, narcosis, coma	eyes, upper respiratory, skin, CNS
Toluene	50 ppm	100 ppm/150 ppm	100 ppm	2,000	1.2%/7.1%	Inh Abs Ing Con	Fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, lacrimation, nervousness, muscle fatigue, insomnia, paresthesia, dermatitis	CNS, liver, skin, kidneys
Xylene (O, M, P, isomers)	100 ppm/ 150 ppm	100 ppm/150 ppm	100 ppm	1,000	7.0/7.0/7.0% 1.1/1.0/1.1%	Inh Abs Ing Con	Dizziness, excitement, drowsiness, incoordination, staggering gait, irritation of eyes, nose, and throat, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain, and dermatitis	CNS, eyes, GI tract, blood, liver, kidneys, skin
Trichloroethylene	50 ppm/ 100 ppm	50 ppm/200 ppm	25 ppm CA	1,000	8%/10.5%	Inh Ing Con	Headache, vertigo, visual disturbance, tremors, somnolence, nausea, vomiting, eye irritation, dermatitis, cardiac arrhythmias and paresthesia	Respiratory system, heart, liver, kidneys, CNS, skin

•• INH = Inhalation, ING = Ingestion, ABS = Skin absorption, CON = Skin or eye contact

••• 1 = Skin, 2 = Eyes, 3 = Respiratory, 4 = CNS, 5 = Liver, 6 = Kidney, 7 = Blo, 8 = Bla, 9 = Pros, 10 = GI, 11 = Hrt and CAV, C = Carcinogen

Mercury 0.1, Aryl and inorganic compounds, InH = Primary skin, Con = irritant, skin sensitizer

2 6 1570

### TRAINING ASSIGNMENTS

Key on-site personnel will have completed the OSHA 40-hour Hazardous Waste Operations Training and appropriate annual updates. In addition, the environmental project manager shall be on-call during the field work. Other workers on-site but not involved in intrusive sampling activities, or those not expected to receive exposures exceeding permissible exposure limits, shall be required to review this Health and Safety Plan and signify acceptance by signing the form on page 24 herein.

Documentation that training assignments have been met will be required prior to site entry.

### MEDICAL SURVEILLANCE REQUIREMENTS

The OHSO and drilling personnel will have medical clearance to perform work on site. That clearance shall follow protocols at least as stringent as those defined in the Ogden Medical Surveillance Program.

Documentation of medical clearance will be required prior to site entry or be on file with Ogden's Office Health and Safety Coordinator.

INITIAL LEVEL OF PROTECTION:	<input type="checkbox"/> A	<input type="checkbox"/> C	<input type="checkbox"/> Modified D
	<input type="checkbox"/> B	<input checked="" type="checkbox"/> D	
RESPIRATOR:	<input type="checkbox"/> SCBA, Airline,	<input type="checkbox"/> Purif Resp	<input type="checkbox"/> Escape Mask
(Level C and above)	PP*, FF**	<input type="checkbox"/> Other Cart.	
	<input type="checkbox"/> OV/AG Cart.		
PROTECTIVE CLOTHING	<input type="checkbox"/> Encap. Suit	<input type="checkbox"/> To provide	
	<input type="checkbox"/> Sranex	protection from	<input type="checkbox"/> Other
	<input type="checkbox"/> Tyvex	Hg vapor	
		<input type="checkbox"/> Splash Suit	
HEAD/EYE/EAR:	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Goggles
	<input type="checkbox"/> Splash Shield	<input checked="" type="checkbox"/> Ear Plug/muffs	<input type="checkbox"/> Other
GLOVES: (Outer/Inner)	<input type="checkbox"/> Nitrile	<input type="checkbox"/> Neoprene	<input type="checkbox"/> PVC
	<input checked="" type="checkbox"/> Latex	<input type="checkbox"/> Vinyl	<input type="checkbox"/> Other
FOOTWEAR:	<input checked="" type="checkbox"/> Steel-toed Leather	<input type="checkbox"/> Overboots	
	<input checked="" type="checkbox"/> Steel-toed Rubber	<input type="checkbox"/> Other _____	

Modifications Permitted: If work area has standing water or there is a potential for splashing, workers will use PETTYVEK. Also, gloves only required for those workers handling drilling, sampling equipment, and soil ground-water samples.

- \* Positive pressure  
\*\* Full-face respirator

UPGRADE LEVEL OF PROTECTION:	( )	A	(X)	C	( )	Modified
	( )	B	( )	D		
RESPIRATOR:	( )	SCBA, Airline,	( )	Purif Resp	( )	Escape
(Level C and above)		PP*, FF**	( )	Other Cart.		Mask
	(X)	OV/AG Cart.				
PROTECTIVE CLOTHING:	( )	Encap. Suit	( )	Tyvek	( )	Other
	( )	Sranex	( )	Splash Suit		
	(X)	PETYVEK				
HEAD/EYE/EAR:	(X)	Hard Hat	(X)	Safety Glasses	(X)	Goggles
	( )	Splash Shield	(X)	Ear Plug/muffs	( )	Other
GLOVES: (Outer/Inner)	(X)	Nitrile	( )	Neoprene	(X)	PVA
	(X)	Latex	( )	Vinyl	( )	Other
FOOTWEAR:	(X)	Steel-toed Leather	( )	Overboots		
	(X)	Steel-toed Rubber	( )	Other		

Modifications Permitted: PVA gloves will be required if site contaminants include trichloroethylene

- \* Positive pressure
- \*\* Full-face respirator

## AIR SURVEILLANCE

### EXPOSURE MONITORING:

<u>Type</u>	<u>Minimum Recommended Frequency</u>
Background	Once per day in the work area and perimeter using direct-reading instruments, prior to any intrusive activities or equipment start-up
Perimeter	Twice per day using direct-reading instruments during intrusive activities
Personal	At maximum 15-minute intervals during auger advancement at the boring location in the breathing zone of those with the highest anticipated exposure.

**EQUIPMENT:** The OHSO will maintain equipment SOPs onsite that specify calibration, general use, and trouble shooting procedures. All monitoring equipment will be calibrated on a daily basis according to manufacturers instructions.

<u>Equipment</u>	<u>Contaminant</u>
Organic Vapor Meter (OVM)	Organic Vapors
Explosive Gas Indicator	Organic Vapors
Colorimetric tubes	Selected VOCs

**ACTION LEVELS:** Action levels should be established for upgrading/downgrading PPE, work stoppages, and evacuation. Action levels for upgrade/downgrade of respirator are sustained readings above background in the breathing zone of site personnel. Record readings on air surveillance record forms in Appendix 3.

**ACTION LEVELS FOR LEVEL CPPE UPGRADE = 25% OF THE OSHA PEL**

**PRINCIPAL CONTAMINANT PELS:**

Contaminant	PEL	Action Level (¼ PEL)
Ethylbenzene	100 ppm	25 ppm
Toluene	100 ppm	25 ppm
Xylene	100 ppm	25 ppm
Trichloroethylene	50 ppm	12 ppm

Establishment of Action Levels for Total Volatile Hydrocarbons (TVA) using an Organic Vapor Monitor PID, 10.6 eV lamp, calibrated to approximately 100 ppm isobutylene:

**Justification**

**Assumptions:**

- 1) PID is a general survey instrument which potentially reads (ionizes) all volatiles with IPs  $\leq 10.6 = V$  (not compound specific in multi-gas atmospheres).
- 2) Colorimetric tubes will be used to verify trichloroethylene concentrations. Level C upgrade at 12 ppm (include safety factor).
- 3) Discontinuous exposures would not produce employee exposures  $> PEL$ .
- 4) Historical data for similar contaminants produced during drilling did not produce employee exposures  $> PEL$ .
- 5) Perimeter action levels are generally ¼ work zone action level (plus a safety factor) based on a 24 hour exposure, no ability to upgrade, and lower health status generalizations.

**Summary**

Direct Reading Instrument (DRI) action levels for total volatile hydrocarbons (TVH) do not exceed those established for the chemicals of concern and also include a safety factor for instrument response, and concentration variability.

### ACTION LEVELS

<u>Equipment</u>	<u>Action Level</u>	<u>Action to be Taken</u>
PID (OVM) ppm/v equiv. units	< 12 ppm	Maintain Level D
	12 < reading < 25 ppm for 5 minutes in breathing zone	Check colorimetric tube for trichlorethylene if below action level (12 ppm). Maintain level D. If above action level of 12 ppm upgrade to level C (OV/AG).
	≥ 25 ppm for 5 minutes in breathing zone	Maintain level C (OV/AG).
	> 50 ppm for 5 minutes in breathing zone	Evacuate.
Explosimeter . (% explosive gases in air by volume)	> 8 ppm for 5 minutes at perimeter	Cease work until level drops.
	> 10% LEL	Standby, evaluate conditions.
	> 25% LEL	Cease operations and evacuate for 15 minutes, notify Ogden Health and Safety Coordinator.
Colorimetric Tubes trichloroethylene	> 12 ppm	Upgrade to Level C (OV/AG).



## SITE CONTROL

### SITE SECURITY:

Site security will be provided by CSX personnel on an as-needed basis.

### VISITOR ACCESS:

All site visitors must receive prior approval from the OHSO, and may do so only for the purpose of observing site conditions or operations. Upon arrival, visitors will report to the OHSO to be logged in the Site Log Book and undergo a safety orientation. Orientation includes reading the health and safety plan and signing the certification page. Visitors must read Appendix 2 - CSXT Rules and Procedures.

## SAFE WORK PRACTICES

1. Unauthorized personnel are not allowed on-site.
2. Employees will not work alone.
3. Wind flags will be positioned on-site so that work can be performed upwind as much as possible.
4. Smoking, eating, drinking, chewing gum to tobacco, taking medication, and applying cosmetics will not be permitted within any restricted or exclusion zone.
5. Wearing of contact lenses is prohibited.
6. Open flames are not allowed anywhere on-site without an operating permit from the facility.
7. Personnel under the obvious influence of alcohol or controlled substances are not allowed on-site.
8. Personnel will avoid skin contact with contaminated or potentially-contaminated media. If such contact occurs, the contaminated clothing will be removed and the affected areas washed thoroughly with soap and water.
9. Personnel will discard and replace any damaged, or heavily soiled protective clothing.
10. Personnel should notify the on-site health and safety coordinator of any defective monitoring, emergency, or other safety equipment.
11. A supply of potable water, electrolyte replacement solutions, a shaded areas and sufficient lighting will be maintained. On-site sanitary facilities will be accessible to personnel.

## DOCUMENTATION AND RECORDKEEPING

The OHSO must document the implementation of this health and safety plan and will therefore establish and maintain site specific files. The file will contain the following records:

- Field activities kickoff meeting.
- Certification letter(s) of medical and training requirements.
- Signed certification page of this health and safety plan
- Air surveillance records of environmental and exposure monitoring
- Supervisor's report of personnel accidents or environmental incidents
- Documentation of changes to this health and safety plan

**DECONTAMINATION PROCEDURES** (Procedures for the decontamination of sampling tools and other related equipment are specified in the work plan and/or QA plan. Note that separate areas should be established for personnel, sampling and/or heavy equipment decontamination.)

## PERSONNEL DECONTAMINATION:

Reference HS-10 in the Corporate Safety and Health Manual.

## EMERGENCY RESPONSE

General: In the event of a large scale spill, or fire/explosion, field personnel are expected to notify the OHSO and evacuate the area.

Emergency Coordinator (EC): TBA - CSXT Flag-person

Safe Refuge Area: TBD by the EC once on-site, and will be set up in the Support Zone and an off-site location in the event of a facility/site-wide evacuation. Area will be upwind and contain emergency equipment, communications and the Emergency Reference (call) List.

## SITE SPECIFIC RESPONSE SCENARIOS:

### Injury Accident to Project Personnel or Visitors

Summon the EC who will assess the situation, taking first necessary precautions for personal safety (i.e., SCBA) if needed. The EC will determine whether to transport the injured party to the hospital or summon an ambulance. Follow emergency decon procedures, provide first aid to the extent possible while awaiting medical attention. The Site Manager will conduct an investigation and complete the Supervisor's Accident Investigation Report. The EC is responsible for making appropriate notifications.

### Spill of Hazardous Material

After taking precautions for personal safety, contain the spill if possible with on-site equipment. The EC will evacuate all non-response personnel and visitors to the refuge area. Contained materials must be properly drummed and handled as hazardous waste. The EC will notify the corporate Health and Safety Coordinator to contact the EPA within 24 hours after occurrence. MSDSs for materials brought on-site and chemicals of concern are in Appendix 1.

### Fire or Explosion

Summon the EC who will decide whether to call the Fire Department for outside assistance or to respond to "manageable" incidents with portable fire extinguishes. The EC will evacuate all non-response personnel and visitors to the refuge area.

**EMERGENCY REFERENCE LIST (Keep posted in vehicles and near communications system)**

**MEDICAL EMERGENCIES:**

Hospital Name: HCA Southern Hills Medical Center

Hospital Address: 391 Wallace Road

Hospital Telephone: (615) 781-4600

Distance: See attached map

**EMERGENCY SERVICES:**

<u>Title</u>	<u>Name</u>	<u>Telephone Number</u>
Ambulance		911
Fire Department		911
Security	On-Site CSX Flag-person	N/A
Poison Control Center		911
Police		911

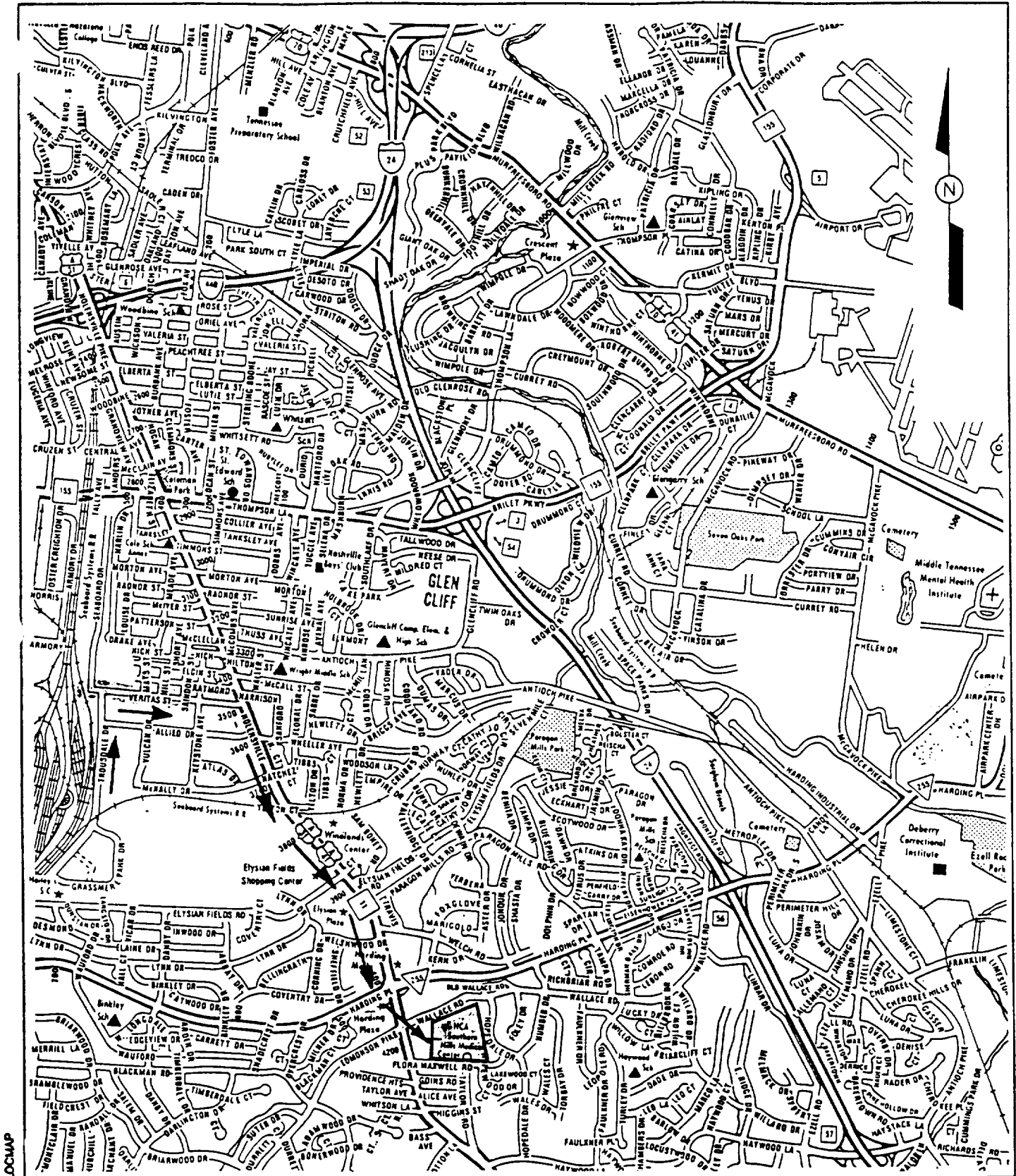
**CALL LIST**

<u>Title</u>	<u>Name</u>	<u>Telephone Number</u>
H&S Manager	Marcella Walsh	333-0630 266
Project Manager	Bernie Voor	333-0630 213
Environmental Manager	Griff Wyatt	333-0630 373
On-Site H&S Officer	Doug Tate	333-0630 238

In the event of a medical emergency, Ogden Human Resources must be notified as soon as possible.

**EMERGENCY EQUIPMENT: (Check all that apply)**

<input checked="" type="checkbox"/> First Aid Kit	<input checked="" type="checkbox"/> Fire Extinguishes	<input type="checkbox"/> Water
<input type="checkbox"/> SCBA	<input type="checkbox"/> Escape Packs	<input type="checkbox"/> Alarms
<input type="checkbox"/> Spill Equipment	<input type="checkbox"/> Mobile Phone	<input type="checkbox"/> Fire Blanket
<input type="checkbox"/> Other _____		



**FIGURE 2**  
**MAP TO HOSPITAL**  
 CSX TRANSPORTATION  
 500 WATER STREET  
 JACKSONVILLE, TENNESSEE  
 SCALE: NOT TO SCALE

## HEALTH AND SAFETY PLAN ACCEPTANCE

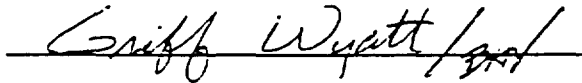
I have had the opportunity to read and ask questions about this health and safety plan. My signature indicates that I understand the procedures and restrictions of this plan and agree to abide by them. This plan includes applicable CSXT Safety Rules and Procedures.

[illegible]

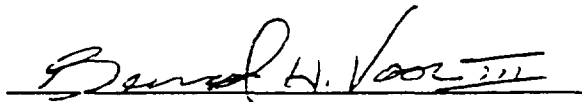
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## PLAN APPROVAL

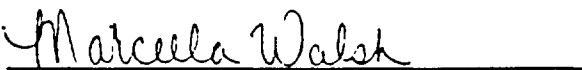
This HSP has been written for the use of Ogden employees and subcontractors involved in this project. Ogden claims no responsibility for its use by others. The HSP is written for the specific site conditions, purposes, and personnel specified and must be amended if these conditions change.



E. Griff Wyatt, P.E.  
Environmental Project Manager  
Ogden Environmental and Energy Services



Bernard H. Voor, III, P.E.  
Project Manager  
Ogden Environmental and Energy Services



Marcella Walsh, C.I.H.  
Health and Safety Coordinator  
Ogden Environmental and Energy Services

## \*\*\*\*\* PHYSICAL DATA SUMMARY \*\*\*\*\*

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CHEMTOX ID NUMBER : 398  
CHEMTOX NAME : TOLUENE  
CAS NUMBER : 108-88-3  
FORMULA/CHEMICAL CLASS : C<sub>7</sub>H<sub>8</sub>/Aromatic hydrocarbon  
MOLECULAR WEIGHT : 92  
PHYSICAL DESCRIPTION : COLORLESS WATERY LIQUID WITH A PLEASANT ODOR  
BOILING POINT : 230.8 F  
MELTING POINT : -139.3 F  
VAPOR PRESSURE : 36.7 mm @ 30 C  
CRITICAL TEMPERATURE : 591.8 Kelvin; 318.65 C; 605.57 F  
CRITICAL PRESSURE : 4.108 kN/M<sup>2</sup>; 40.5 atm; 595 psia  
HEAT OF COMBUSTION : -17430 Btu/lb; -9690 cal/g; -405x E5 J/kg  
HEAT OF VAPORIZATION : 155 Btu/lb; 86.08 cal/g; 3.601x E5 J/kg  
WATER SOLUBILITY : 0.05 %  
SPECIFIC GRAVITY : 0.867 @ 20 C  
IONIZATION POTENTIAL : 8.82 eV  
FLASH POINT (CC) : 40 F  
UEL : 7.1 %  
LEL : 1.3 %  
AUTOIGNITION TEMP : 996.5 F  
F2=Fahrenheit, F3=Celsius (Centigrade), F4=Kelvin, F5=atm units, F6=mm units,  
F7=expand sp gr F8=graph vp <Return> to quit.

Sources: CHRIS Manual  
and NIOSH/OSHA Guide



## \*\*\*\*\* CHEMTOX TOXICOLOGICAL DATA \*\*\*\*\*

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CHEMTOX RECORD :398

NAME :TOLUENE

CAS NUMBER :108-88-3

IDLH :2000 ppm Source: NIOSH

OSHA DATA :Transitional Limits:

PEL = 200 PPM; CEILING = 300 PPM; MAXIMUM PEAK ABOVE CEILING FOR 10 MINUTES = 500

Final Rule Limits:

TWA = 100 ppm (375 mg/M3)

STEL = 150 ppm(560 mg/M3)

ACGIH TLV :TLV = 100 ppm(375 mg/M3) STEL: STEL = 150 ppm(560 mg/M3)

TARGET ORGANS :CNS, LIVER, KIDNEYS, SKIN, EYES Source: NIOSH

REPRODUCTIVE TOX :This chemical is a reproductive toxin to mammals.

SHORT TERM TOX :Inhalation: 100 PPM EXPOSURE CAN CAUSE DIZZINESS, DROWSINESS AND HALLUCINATIONS. 100-200 PPM CAN CAUSE DEPRESSION. 200-500 PPM CAN CAUSE HEADACHES, NAUSEA, DEPRESSION. 200-500 PPM CAN CAUSE HEADACHES, NAUSEA, LOSS OF APPETITE, LOSS OF ENERGY, LOSS OF COORDINATION AND COMA. IN ADDITION TO THE ABOVE, DEATH HAS RESULTED FROM EXPOSURE TO 10,000 PPM FOR AN UNKNOWN TIME.<sup>2</sup>Skin: CAN CAUSE DRYNESS AND IRRITATION. ABSORPTION MAY CAUSE OR INCREASE THE SEVERITY OF SYMPTOMS LISTED ABOVE.<sup>3</sup>Eyes: CAN CAUSE IRRITATION AT 300 PPM.<sup>2</sup>Ingestion: CAN CAUSE A BURNING SENSATION IN THE MOUTH AND STOMACH, UPPER ABDOMINAL PAIN, COUGH, HOARSENESS, HEADACHE, NAUSEA, LOSS OF APPETITE, LOSS OF ENERGY, LOSS OF COORDINATION AND COMA.(NYDH)

LONG TERM TOX :LEVELS BELOW 200 PPM MAY PRODUCE HEADACHE, TIREDNESS AND NAUSEA. FROM 200 TO 750 PPM SYMPTOMS MAY INCLUDE INSOMNIA, IRRITABILITY, DIZZINESS, SOME LOSS OF MEMORY, LOSS OF APPETITE, A FEELING OF DRUNKENESS AND DISTURBED MENSTRUATION. LEVELS UP TO 1,500 PPM MAY CAUSE HEART PALPITATIONS AND LOSS OF COORDINATION. BLOOD EFFECTS AND ANEMIA HAVE BEEN REPORTED BUT ARE PROBABLY DUE TO CONTAMINATION BY BENZENE. MOST OF THESE EFFECTS AREA BELIEVED TO GO AWAY WHEN EXPOSURE STOPS.(NYDH)

## MEDICAL CON'DTION

AGGRAVATED :No data available

SIGNS/SYMPTOMS :Vapors irritate eyes and upper respiratory tract; cause dizziness, headache, anesthesia, respiratory arrest. Liquid irritates eyes and causes drying of skin. If aspirated, causes coughing, gagging, distress, and rapidly developing pulmonary edema. If ingested causes vomiting, griping, diarrhea, depressed respiration. Source: CHRIS

## Material Safety Data Sheet

Required under USDOL Safety and Health Regulations  
or Shipyard Employment (29 CFR 1915)

U.S. Department of Labor

Occupational Safety and Health Administration

2 0

1585



OMB No. 1218-0074  
Expiration Date 05/31/86

PREPARED 1/10/86

## Section I

Manufacturer's Name

Emergency Telephone Number

ALCONOX, INC.

(212) 473-1300

Address (Number, Street, City, State, and ZIP Code)

215 PARK AVENUE SOUTH

Chemical Name  
and Synonyms

N.A.

NEW YORK, N.Y. 10003

Trade Name  
and Synonyms

ALCONOX

Chemical  
Family

Formula

ANIONIC DETERGENT

N.A.

C6300-1, C6301-1, C6301-2, -3, -4, -5

## Section II - Hazardous Ingredients

DSI-502

Paints, Preservatives, and Solvents

% TLV (Units) Alloys and Metallic Coatings

% TLV (Units)

Pigments

NONE

Base Metal

NONE

Catalyst

NONE

Alloys

NONE

Vehicle

NONE

Metallic Coatings

NONE

Solvents

NONE

Filler Metal  
Plus Coating or Core Flux

NONE

Additives

NONE

Others

NONE

NONE

Hazardous Mixtures of Other Liquids, Solids or Gases

% TLV (Units)

NONE

## Section III - Physical Data

Boiling Point (°F)

N.A.

Specific Gravity (H<sub>2</sub>O=1)

N.A.

Vapor Pressure (mm Hg.)

N.A.

Percent Volatile by Volume (%)

N.A.

Vapor Density (AIR=1)

N.A.

Evaporation Rate

=1)

N.A.

Solubility in Water

APPRECIABLE

Appearance and Odor

WHITE POWDER INTERSPERSED WITH CREAM COLORED FLAKES - ODORLESS

## Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)

NONE

Flammable Limits

N.A.

Lel

N.A.

Uel

N.A.

Extinguishing Media

WATER, CO<sub>2</sub>, DRY CHEMICAL, FOAM, SAND/EARTH

Fire Fighting Procedures

FOR FIRES INVOLVING THIS MATERIAL, DO NOT ENTER WITHOUT

PROTECTIVE EQUIPMENT AND SELF CONTAINED BREATHING APPARATUS

Unusual Fire and Explosion Hazards.

NONE

## Section V - Health Hazard Data

Threshold Limit Value

NO DATA AVAILABLE - TREAT AS NUISANCE DUST

Effects of Overexposure

PROLONGED EXPOSURE TO DUST MAY IRRITATE MUCOUS MEMBRANES

## Emergency First Aid Procedures

EYES - FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. SKIN-FLUSH WITH PLENTY OF WATER. INGESTION - DRINK LARGE QUANTITIES OF WATER TO DILUTE MATERIAL. GET MEDICAL ATTENTION FOR DISCOMFORT.

## Section VI - Reactivity Data

Stability	Unstable	Conditions to Avoid	NONE
	Stable X		

Incompatibility (Materials to Avoid)

AVOID STRONG ACIDS

Hazardous Decomposition Products

MAY RELEASE CO<sub>2</sub> GAS ON BURNING

Hazardous Polymerization	May Occur	Conditions to Avoid	NONE
	Will Not Occur X		

## Section VII - Spill or Leak Procedures

Steps to be Taken in Case Material is Released or Spilled

MATERIAL FOAMS PROFUSELY, SHOVEL AND RECOVER AS MUCH AS POSSIBLE. RINSE REMAINDER TO SEWER. MATERIAL IS COMPLETELY BIODEGRADABLE.

Waste Disposal Method

SMALL QUANTITIES MAY BE DISPOSED OF IN SEWER. LARGE QUANTITIES SHOULD BE DISPOSED OF ACCORDING TO LOCAL REQUIREMENTS FOR NON-HAZARDOUS DETERGENT

## Section VIII - Special Protection Information

Respiratory Protection (Specify Type)

DUST MASK

Ventilation	Local Exhaust	NORMAL	Special	N.A.
	Mechanical (General)	N.A.	Other	N.A.

Protective Gloves

USEFUL - NOT REQUIRED

Eye Protection

USEFUL - NOT REQUIRED

Other Protective Equipment

NOT REQUIRED

## Section IX - Special Precautions

Precautions to be Taken in Handling and Storing

SHOULD BE STORED IN A DRY AREA TO

PREVENT CAKING

Other Precautions

NO SPECIAL REQUIREMENTS OTHER THAN THE GOOD INDUSTRIAL HYGIENE AND SAFETY PRACTICES EMPLOYED WITH ANY INDUSTRIAL CHEMICAL.

Common Synonyms 1,3-Dimethylbenzene Xylo		Watery liquid	Colorless	Sweet odor
Floats on water. Flammable, irritating vapor is produced.				
Stop discharge if possible. Keep people away. Call fire department. Avoid contact with liquid and vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.				
Fire	FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear self-contained breathing apparatus. Extinguish with foam, dry chemical, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.			
Exposure	CALL FOR MEDICAL AID. VAPOR Irritating to eyes, nose, and throat. If inhaled, will cause headache, difficult breathing, or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. LIQUID Irritating to skin and eyes. If swallowed, will cause nausea, vomiting, or loss of consciousness. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.			
Water Pollution	HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. Floating to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.			
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Evacuate area Should be removed Chemical and physical treatment		2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3		
3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Aromatic Hydrocarbon 3.2 Formula: $m\text{-C}_8\text{H}_{10}$ 3.3 IMO/UN Designation: 3.2/1307 3.4 DOT ID No.: 1307 3.5 CAS Registry No.: 108-38-3		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Like benzene, characteristic aromatic		
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Approved canister or air-supplied mask; goggles or face shield; plastic gloves and boots. 5.2 Symptoms Following Exposure: Vapors cause headache and dizziness. Liquid irritates eyes and skin. If taken into lungs, causes severe coughing, distress, and rapidly developing pulmonary edema. If ingested, causes nausea, vomiting, cramps, headache, and coma; can be fatal. Kidney and liver damage can occur. 5.3 Treatment of Exposure: INHALATION: remove to fresh air; administer artificial respiration and oxygen if required; call a doctor. INGESTION: do NOT induce vomiting; call a doctor. EYES: flush with water for at least 15 min. SKIN: wipe off, wash with soap and water. 5.4 Threshold Limit Value: 100 ppm 5.5 Short Term Inhalation Limit: 300 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 2; $LD_{50} = 50$ to 500 g/kg 5.7 Late Toxicity: Kidney and liver damage. 5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight stinging of the eyes or respiratory system if present in high concentrations. The effect is temporary. 5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause stinging and reddening of the skin. 5.10 Odor Threshold: 0.05 ppm 5.11 IDLH Value: 10,000 ppm				

6. FIRE HAZARDS 6.1 Flash Point: 84°F C.C. 6.2 Flammable Limits in Air: 1.1%-6.4% 6.3 Fire Extinguishing Agents: Foam, dry chemical, or carbon dioxide 6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective. 6.5 Special Hazards of Combustion Products: Not pertinent 6.6 Behavior in Fire: Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back. 6.7 Ignition Temperature: 968°F 6.8 Electrical Hazard: Class I, Group D 6.9 Burning Rate: 5.8 mm/min. 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available		10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U	
7. CHEMICAL REACTIVITY 7.1 Reactivity With Water: No reaction 7.2 Reactivity with Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Motor Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 32		11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flammable liquid 11.2 NAS Hazard Rating for Bulk Water Transportation: Category Rating Fire _____ 3 Health _____ Vapor Irritant _____ 1 Liquid or Solid Irritant _____ 1 Poisons _____ 2 Water Pollution _____ Human Toxicity _____ 1 Aquatic Toxicity _____ 3 Aesthetic Effect _____ 2 Reactivity _____ Other Chemicals _____ 1 Water _____ 0 Self Reaction _____ 0 11.3 NFPA Hazard Classification: Category Classification Health Hazard (Blue) _____ 2 Flammability (Red) _____ 3 Reactivity (Yellow) _____ 0	
8. WATER POLLUTION 8.1 Aquatic Toxicity: 22 ppm/96 hr/bluegill/TL <sub>50</sub> /fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 0 lb/lb, 5 days: 0% (theor.), 8 days 8.4 Food Chain Concentration Potential: Data not available		12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 108.16 12.3 Boiling Point at 1 atm: 258.4°F = 131.9°C = 405.1°K 12.4 Freezing Point: -54.2°F = -47.9°C = 225.3°K 12.5 Critical Temperature: 660.8°F = 343.8°C = 617.0°K 12.6 Critical Pressure: 513.8 atm = 34.95 psia = 3.540 MN/m <sup>2</sup> 12.7 Specific Gravity: 0.864 at 20°C (liquid) 12.8 Liquid Surface Tension: 28.6 dynes/cm = 0.0296 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 36.4 dynes/cm = 0.0364 N/m at 30°C 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): 1.071 12.12 Latent Heat of Vaporization: 147 Btu/lb = 81.9 cal/g = $3.43 \times 10^4$ J/kg 12.13 Heat of Combustion: -17,554 Btu/lb = -9752.4 cal/g = $-406.31 \times 10^4$ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.17 Heat of Fusion: 26.01 cal/g 12.18 Limiting Value: Data not available 12.19 Reid Vapor Pressure: 0.34 psia	
9. SHIPPING INFORMATION 9.1 Grades of Purity: Research: 99.99%; Pure: 99.9%; Technical: 99.2% 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester) or pressure-vacuum		NOTES	

Common Synonyms 2-Dimethylbenzene Xylol		Wetly liquid	Colorless	Sweet odor
Floats on water. Flammable, misting vapor is produced.				
Stop discharge if possible. Keep people away. Call fire department. Avoid contact with liquid and vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.				
Fire	FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear self-contained breathing apparatus. Extinguish with foam, dry chemical, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.			
Exposure	CALL FOR MEDICAL AID.  VAPOR Irritating to eyes, nose and throat. If inhaled, will cause headache, difficult breathing, or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.  LIQUID Irritating to skin and eyes. If swallowed, will cause nausea, vomiting, or loss of consciousness. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.			
Water Pollution	Dangerous to aquatic life in high concentrations. Floating to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.			
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Evacuate area Should be removed Chemical and physical treatment		2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3		
3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Aromatic Hydrocarbon 3.2 Formula: $\text{C}_8\text{H}_{10}$ (CH <sub>3</sub> ) <sub>2</sub> 3.3 IMO/UN Designation: 3.2/1307 3.4 DOT ID No.: 1307 3.5 CAS Registry No.: 95-47-4		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Benzene-like; characteristic aromatic		
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Approved canister or air-supplied mask; goggles or face shield; plastic gloves and boots. 5.2 Symptoms Following Exposure: Vapors cause headache and dizziness. Liquid irritates eyes and skin. If taken into lungs, causes severe coughing, distress, and rapidly developing pulmonary edema. If ingested, causes nausea, vomiting, cramps, headache, and coma. Can be fatal. Kidney and liver damage can occur. 5.3 Treatment of Exposure: INHALATION: remove to fresh air; administer artificial respiration and oxygen if required; call a doctor. INGESTION: do NOT induce vomiting; call a doctor. EYES: Flush with water for at least 15 min. SKIN: wipe off, wash with soap and water. 5.4 Threshold Limit Value: 100 ppm 5.5 Short Term Inhalation Limit: 300 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 3; LD <sub>50</sub> = 50 to 500 mg/kg 5.7 Lethal Toxicity: Kidney and liver damage. 5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary. 5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin. 5.10 Odor Threshold: 0.05 ppm 5.11 IDLH Value: 10,000 ppm				

<b>6. FIRE HAZARDS</b> 6.1 Flash Point: 63°F C.C.; 75°F O.C. 6.2 Flammable Limits in Air: 1.1%-7.0% 6.3 Fire Extinguishing Agents: Foam, dry chemical, or carbon dioxide 6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective. 6.5 Special Hazards of Combustion Products: Not pertinent 6.6 Behavior in Fire: Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back. 6.7 Ignition Temperature: 888°F 6.8 Electrical Hazard: Class I, Group D 6.9 Burning Rate: 5.8 mm/min. 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stochiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available	<b>10. HAZARD ASSESSMENT CODE</b> (See Hazard Assessment Handbook) A-T-U																																				
<b>7. CHEMICAL REACTIVITY</b> 7.1 Reactivity With Water: No reaction 7.2 Reactivity With Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 32	<b>11. HAZARD CLASSIFICATIONS</b> 11.1 Code of Federal Regulations: Flammable liquid 11.2 HAS Hazard Rating for Bulk Water Transportation: <table><thead><tr><th>Category</th><th>Rating</th></tr></thead><tbody><tr><td>Fire</td><td>3</td></tr><tr><td>Health</td><td></td></tr><tr><td>Vapor Irritant</td><td>1</td></tr><tr><td>Liquid or Solid Irritant</td><td>1</td></tr><tr><td>Poisons</td><td>2</td></tr><tr><td>Water Pollution</td><td></td></tr><tr><td>Human Toxicity</td><td>1</td></tr><tr><td>Aquatic Toxicity</td><td>3</td></tr><tr><td>Aesthetic Effect</td><td>2</td></tr><tr><td>Reactivity</td><td></td></tr><tr><td>Other Chemicals</td><td>1</td></tr><tr><td>Water</td><td>0</td></tr><tr><td>Self Reaction</td><td>0</td></tr></tbody></table> 11.3 NFPA Hazard Classification: <table><thead><tr><th>Category</th><th>Classification</th></tr></thead><tbody><tr><td>Health Hazard (Blue)</td><td>2</td></tr><tr><td>Flammability (Red)</td><td>3</td></tr><tr><td>Reactivity (Yellow)</td><td>0</td></tr></tbody></table>	Category	Rating	Fire	3	Health		Vapor Irritant	1	Liquid or Solid Irritant	1	Poisons	2	Water Pollution		Human Toxicity	1	Aquatic Toxicity	3	Aesthetic Effect	2	Reactivity		Other Chemicals	1	Water	0	Self Reaction	0	Category	Classification	Health Hazard (Blue)	2	Flammability (Red)	3	Reactivity (Yellow)	0
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<b>8. WATER POLLUTION</b> 8.1 Aquatic Toxicity: >100 mg/L/96 hr/D. magna/TL <sub>50</sub> /fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 0 lb/lb, 5 days; 2.5% (Theor.), 8 days 8.4 Feed Chain Concentration Potential: Data not available	<b>12. PHYSICAL AND CHEMICAL PROPERTIES</b> 12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 106.16 12.3 Boiling Point at 1 atm: 291.9°F = 144.4°C = 417.6°K 12.4 Freezing Point: -13.2°F = -25.2°C = 248.0°K 12.5 Critical Temperature: 674.8°F = 357.1°C = 630.3°K 12.6 Critical Pressure: 541.5 atm = 36.84 psi = 3,732 MN/m <sup>2</sup> 12.7 Specific Gravity: 0.880 at 20°C (liquid) 12.8 Liquid Surface Tension: 30.53 dynes/cm = 0.0053 N/m at 15.5°C 12.9 Liquid Water Interfacial Tension: 36.06 dynes/cm = 0.03606 N/m at 20°C 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): 1.068 12.12 Latent Heat of Vaporization: 148 Btu/lb = 82.9 cal/g = 3.47 X 10 <sup>4</sup> J/kg 12.13 Heat of Combustion: -17,556 Btu/lb = -8754.7 cal/g = -408.41 X 10 <sup>4</sup> J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: 30.64 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 0.28 psi																																				
<b>9. SHIPPING INFORMATION</b> 9.1 Grades of Purity: Research: 99.99%; Pure: 99.7%; Commercial: 95+ % 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No reaction 9.4 Venting: Open (flame arrester) or pressure-vacuum	<b>NOTES</b>																																				

Common Synonyms p-Dimethylbenzene Xylol		Watery liquid	Colorless	Sweet odor
		Floats on water. Flammable. Irritating vapor is produced. Freezing point is 56°F		
Stop discharge if possible. Keep people away. Call fire department. Avoid contact with liquid and vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.				
Fire	FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear self-contained breathing apparatus. Extinguish with foam, dry chemical, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.			
Exposure	CALL FOR MEDICAL AID. VAPOR Irritating to eyes, nose and throat. If inhaled, will cause dizziness, difficult breathing, or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. LIQUID Irritating to skin and eyes. If swallowed, will cause nausea, vomiting, loss of consciousness. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES: hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.			
Water Pollution	HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. Fouling to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.			
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Leave warning-high flammability Evacuate area Should be removed Chemical and physical treatment		2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3		
3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Aromatic Hydrocarbon 3.2 Formula: p-C <sub>6</sub> H <sub>4</sub> (CH <sub>3</sub> ) <sub>2</sub> 3.3 IMO/UN Designation: 3.2/1307 3.4 DOT ID No.: 1307 3.5 CAS Registry No.: 106-42-3		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Like benzene; characteristic aromatic		
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Approved canister or air-supplied mask; goggles or face shield; plastic gloves and boots. 5.2 Symptoms Following Exposure: Vapors cause headache and dizziness. Liquid irritates eyes and skin. If taken into lungs, causes severe coughing, distress, and rapidly developing pulmonary edema. If ingested, causes nausea, vomiting, cramps, headache, and coma. Can be fatal. Kidney and liver damage can occur. 5.3 Treatment of Exposure: INHALATION: remove to fresh air; administer artificial respiration and oxygen if required; call a doctor. INGESTION: do NOT induce vomiting; call a doctor. EYES: flush with water for at least 15 min. SKIN: wipe off, wash with soap and water. 5.4 Threshold Limit Value: 100 ppm 5.5 Short Term Inhalation Limit: 300 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 3; LD <sub>50</sub> = 50 to 500 mg/kg 5.7 Late Toxicity: Kidney and liver damage. 5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight stinging of the eyes or respiratory system if present in high concentrations. The effect is temporary. 5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause stinging and reddening of the skin. 5.10 Odor Threshold: 0.05 ppm 5.11 IDLH Value: 10,000 ppm				

6. FIRE HAZARDS 6.1 Flash Point 81°F C.C. 6.2 Flammable Limits in Air: 1.1%-6.6% 6.3 Fire Extinguishing Agents: Foam, dry chemical, or carbon dioxide 6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective 6.5 Special Hazards of Combustion Products: Not pertinent 6.6 Behavior in Fire: Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back. 6.7 Ignition Temperature: 870°F 6.8 Electrical Hazard: Class I, Group D 6.9 Burning Rate: 5.6 mm/min 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available	10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U																																				
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9. SHIPPING INFORMATION 9.1 Grades of Purity: Research: 99.99%; Pure: 99.8%; Technical: 98.0% 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester) or pressure-vacuum	NOTES																																				

Common Synonyms	Watery liquid	Colorless	Sweet odor
Trichloroethylene Triclene; Alkylen Chloroilen Gomalgene Trelene Trichloron; Trelene	Sinks in water. Irritating vapor is produced.		
Stop discharge if possible. Keep people away. Avoid contact with liquid and vapor. Call fire department. Isolate and remove discharged material. Notify local health and pollution control agencies.			
Fire	Combustible. <b>POISONOUS GASES ARE PRODUCED IN FIRE.</b> Wear goggles and self-contained breathing apparatus. Extinguish with dry chemical, carbon dioxide, or foam.		
Exposure	CALL FOR MEDICAL AID. <b>VAPOR</b> Irritating to eyes, nose and throat. If inhaled, will cause nausea, vomiting, difficult breathing, or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. <b>LIQUID</b> Irritating to skin and eyes. If swallowed, will cause nausea, vomiting, difficult breathing, or loss of consciousness. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk and have victim induce vomiting. IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.		
Water Pollution	Effect of low concentrations on aquatic life is unknown. May be dangerous if it enters water intakes. Notify local health and water officials. Notify operators of nearby water intakes.		
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Should be removed Chemical and physical treatment		2. LABEL 2.1 Category: None 2.2 Class: Not pertinent	
3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Halogenated hydrocarbon 3.2 Formula: $\text{CHCl}_2=\text{CCl}_2$ 3.3 BCG/UM Designations: 8.0/1710 3.4 DOT ID No.: 1710 3.5 CAS Registry No.: 79-01-8		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Chloroform-like, ethereal	
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Organic vapor-acid gas canister; self-contained breathing apparatus for emergencies; neoprene or vinyl gloves; chemical safety goggles; face shield; neoprene safety shoes; neoprene suit or apron for splash protection. 5.2 Symptoms Following Exposure: <b>INHALATION:</b> symptoms range from irritation of the nose and throat to nausea, an attitude of irresponsibility, blurred vision, and finally disturbance of central nervous system resulting in cardiac failure. Chronic exposure may cause organic injury. <b>INGESTION:</b> symptoms similar to inhalation. <b>SKIN:</b> irritating action can cause dermatitis. <b>EYES:</b> slightly irritating sensation and lachrymation. 5.3 Treatment of Exposure: Do NOT administer adrenalin or epinephrine; get medical attention for all cases of overexposure. <b>INHALATION:</b> remove victim to fresh air; if necessary, apply artificial respiration and/or administer oxygen. <b>INGESTION:</b> have victim drink water and induce vomiting; repeat three times; then give 1 tablespoon epsom salts in water. <b>EYES:</b> flush thoroughly with water. <b>SKIN:</b> wash thoroughly with soap and warm water. 5.4 Threshold Limit Value: 50 ppm 5.5 Short Term Inhalation Limit: 200 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 3; $\text{LD}_{50} = 50$ to 500 mg/kg 5.7 Late Toxicity: Data not available 5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary. 5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin. 5.10 Odor Threshold: 50 ppm 5.11 IDLH Value: 1,000 ppm			

<b>6. FIRE HAZARDS</b> 6.1 Flash Point: 90°F C.C.; practically nonflammable 6.2 Flammable Limits in Air: 8.0%-10.5% 6.3 Fire Extinguishing Agents: Water fog 6.4 Fire Extinguishing Agents Not to be Used: Not pertinent 6.5 Special Hazards of Combustion: Products: Toxic and irritating gases are produced in fire situations. 6.6 Behavior in Fire: Not pertinent 6.7 Ignition Temperature: 770°F 6.8 Electrical Hazard: Not pertinent 6.9 Burning Rate: Not pertinent 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available	<b>10. HAZARD ASSESSMENT CODE</b> (See Hazard Assessment Handbook) A-X-Y																																				
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Flammability (Red)	1																																				
Reactivity (Yellow)	0																																				
<b>8. WATER POLLUTION</b> 8.1 Aquatic Toxicity: 860 mg/L/40 hr/daphnia/mL/fresh water 8.2 Waterborne Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): Data not available 8.4 Food Chain Concentration Potential: None	<b>12. PHYSICAL AND CHEMICAL PROPERTIES</b> 12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 131.39 12.3 Boiling Point at 1 atm: 189°F = 87°C = 360°K 12.4 Freezing Point: -123.5°F = -86.4°C = 186.8°K 12.5 Critical Temperature: Not pertinent 12.6 Critical Pressure: Not pertinent 12.7 Specific Gravity: 1.48 at 20°C (liquid) 12.8 Liquid Surface Tension: 29.3 dynes/cm = 0.0293 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 34.5 dynes/cm = 0.0345 N/m at 24°C 12.10 Vapor (Gas) Specific Gravity: 4.5 12.11 Ratio of Specific Heats of Vapor (Gas): 1.116 12.12 Latent Heat of Vaporization: 103 Btu/lb = 37.2 cal/g = $2.4 \times 10^4$ J/kg 12.13 Heat of Combustion: Not pertinent 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: Data not available 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 2.5 psi																																				
<b>9. SHIPPING INFORMATION</b> 9.1 Grades of Purity: Technical; dry cleaning; degreasing; extraction 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Pressure-vacuum	<b>NOTES</b>																																				

Common Synonyms Isopropanol 2-Propanol Dimethylcarbinol sec-Propyl alcohol Rubbing alcohol Pristanol		Watery liquid  Colorless  Unpleasant alcohol odor like rubbing alcohol  Stop discharge if possible. Keep people away.	
Shut off ignition sources and call fire department. Stay upwind and use water spray to "knock down" vapor. Avoid contact with liquid and vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.			
Fire		FLAMMABLE. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Extinguish with dry chemical, alcohol foam, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.	
Exposure		CALL FOR MEDICAL AID.  VAPOR Irritating to eyes, nose and throat. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.  LIQUID Irritating to eyes. Harmful if swallowed. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.	
Water Pollution		Dangerous to aquatic life in high concentrations. May be dangerous if it enters water intakes.  Notify local health and wildlife officials. Notify operators of nearby water intakes.	
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Disperse and flush		2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3	
3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Alcohol, glycol 3.2 Formula: CH <sub>3</sub> CH(OH)CH <sub>3</sub> 3.3 IMO/UN Designations: 3.2/1219 3.4 DOT ID No.: 1219 3.5 CAS Registry No.: 67-63-0		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Like ethyl alcohol; sharp, somewhat unpleasant characteristic; mild alcoholic; nonresidual	
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Organic vapor canister or air-supplied mask; chemical goggles or face splash shield. 5.2 Symptoms Following Exposure: Vapors cause mild irritation of eyes and upper respiratory tract; high concentrations may be anesthetic. Liquid irritates eyes and may cause injury; harmless to skin; if ingested causes drunkenness and vomiting. 5.3 Treatment of Exposure: INHALATION: If victim is overcome by vapors, remove from exposure immediately; call a physician if breathing is irregular or has stopped; start resuscitation and administer oxygen. EYES: flush with water for at least 15 min. 5.4 Threshold Limit Value: 400 ppm 5.5 Short Term Inhalation Limit: 400 ppm for 10 min. 5.6 Toxicity by Ingestion: Grade 1; LD <sub>50</sub> = 5 to 15 g/kg (rat); LD <sub>50</sub> : 5.84 g/kg 5.7 Late Toxicity: Data not available 5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary. 5.9 Liquid or Solid Irritant Characteristics: No appreciable hazard. Practically harmless to the skin. 5.10 Odor Threshold: 90 mg/m <sup>3</sup> 5.11 IDLH Value: 20,000 ppm			

<b>6. FIRE HAZARDS</b> 6.1 Flash Point: 65°F O.C., 53°F C.C. 6.2 Flammable Limits in Air: 2.3%-12.7% 6.3 Fire Extinguishing Agents: Alcohol foam, dry chemical, or carbon dioxide 6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective 6.5 Special Hazards of Combustion Products: Not pertinent 6.6 Behavior in Fire: Not pertinent 6.7 Ignition Temperature: 750°F 6.8 Electrical Hazard: Class I, Group D 6.9 Burning Rate: 2.3 mm/min 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available	<b>10. HAZARD ASSESSMENT CODE</b> (See Hazard Assessment Handbook) A-P-Q-R-S
<b>7. CHEMICAL REACTIVITY</b> 7.1 Reactivity With Water: No reaction 7.2 Reactivity with Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 20	<b>11. HAZARD CLASSIFICATIONS</b> 11.1 Code of Federal Regulations: Flammable liquid 11.2 NAS Hazard Rating for Bulk Water Transportation: Category Rating Fire _____ 3 Health _____ Vapor Irritant _____ 1 Liquid or Solid Irritant _____ 0 Poisons _____ 2 Water Pollution Human Toxicity _____ 2 Aquatic Toxicity _____ 2 Aesthetic Effect _____ 1 Reactivity Other Chemicals _____ 2 Water _____ 0 Self Reaction _____ 0 11.3 NFPA Hazard Classification: Category Classification Health Hazard (Blue) _____ 1 Flammability (Red) _____ 3 Reactivity (Yellow) _____ 0
<b>8. WATER POLLUTION</b> 8.1 Aquatic Toxicity: 900-1100 ppm/24 hr/chub/critical range/fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 133%, 5 days 8.4 Food Chain Concentration Potential: None	<b>12. PHYSICAL AND CHEMICAL PROPERTIES</b> 12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 60.10 12.3 Boiling Point at 1 atm: 180.1°F = 82.3°C = 355.5°K 12.4 Freezing Point: -127.3°F = -88.5°C = 184.7°K 12.5 Critical Temperature: 455.4°F = 235.2°C = 508.4°K 12.6 Critical Pressure: 681 psia = 47.0 atm = 4.76 MN/m <sup>2</sup> 12.7 Specific Gravity: 0.785 at 20°C (liquid) 12.8 Liquid Surface Tension: Not pertinent 12.9 Liquid Water Interfacial Tension: Not pertinent 12.10 Vapor (Gas) Specific Gravity: 2.1 12.11 Ratio of Specific Heats of Vapor (Gas): 1.105 12.12 Latent Heat of Vaporization: 286 Btu/lb = 159 cal/g = $6.66 \times 10^4$ J/kg 12.13 Heat of Combustion: -12,960 Btu/lb = -7,201 cal/g = $-301.5 \times 10^3$ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution (est): -9 Btu/lb = -5 cal/g = $-0.2 \times 10^4$ J/kg 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: 21.37 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 1.4 psia
<b>9. SHIPPING INFORMATION</b> 9.1 Grades of Purity: 91%, 95% Anhydrous 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester) or pressure-vacuum	<b>NOTES</b>



Common Synonyms Phenyltoluene EB	Liquid	Colorless	Sweet, gasoline-like odor
Floats on water. Flammable, irritating vapor is produced.			
Avoid contact with liquid and vapor. Keep people away. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Shut off ignition sources and call fire department. Stop discharge if possible. Stay upwind and use water spray to "knock down" vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.			
Fire	FLAMMABLE. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Extinguish with dry chemical, foam, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.		
Exposure	CALL FOR MEDICAL AID.  VAPOR Irritating to eyes, nose and throat. If inhaled, will cause dizziness or difficult breathing. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.  LIQUID Will burn skin and eyes. Harmful if swallowed. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES: hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.		
Water Pollution	HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. Fouling to shoreline. May be dangerous if it enters water intakes.  Notify local health and wildlife officials. Notify operators of nearby water intakes.		
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Mechanical containment Should be removed Chemical and physical treatment		2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3	
3. CHEMICAL DESIGNATIONS 3.1 CQ Compatibility Class: Aromatic hydrocarbon 3.2 Formula: C <sub>8</sub> H <sub>10</sub> CH <sub>3</sub> 3.3 IMO/UN Designation: 3.3/1175 3.4 DOT ID No.: 1175 3.5 CAS Registry No.: 100-41-4		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Aromatic	
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Self-contained breathing apparatus; safety goggles. 5.2 Symptoms Following Exposure: Inhalation may cause irritation of nose, dizziness, depression. Moderate irritation of eye with corneal injury possible. Irritates skin and may cause blisters. 5.3 Treatment of Exposure: INHALATION: if effects occur, remove victim to fresh air, keep him warm and quiet, and get medical help promptly; if breathing stops, give artificial respiration. INGESTION: induce vomiting only upon physician's approval; material in lung may cause chemical pneumonia. SKIN AND EYES: promptly flush with plenty of water (15 min. for eyes) and get medical attention; remove and wash contaminated clothing before reuse. 5.4 Threshold Limit Value: 100 ppm 5.5 Short Term Inhalation Limit: 200 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 2; LD <sub>50</sub> = 0.5 to 5 g/kg (rat) 5.7 Late Toxicity: Data not available 5.8 Vapor (Gas) Irritant Characteristics: Vapors cause moderate irritation such that personnel will find high concentrations unpleasant. The effect is temporary. 5.9 Liquid or Solid Irritant Characteristics: Causes smearing of the skin and first-degree burns on short exposure; may cause secondary burns on long exposure. 5.10 Odor Threshold: 140 ppm 5.11 IDLH Value: 2,000 ppm			

<p>6. FIRE HAZARDS</p> <p>6.1 Flash Point: 80°F O.C., 59°F C.C.</p> <p>6.2 Flammable Limits in Air: 1.0%-8.7%</p> <p>6.3 Fire Extinguishing Agents: Foam (most effective), water fog, carbon dioxide or dry chemical.</p> <p>6.4 Fire Extinguishing Agents Not to be Used: Not pertinent</p> <p>6.5 Special Hazards of Combustion: Products: Irritating vapors are generated when heated.</p> <p>6.6 Behavior in Fire: Vapor is heavier than air and may travel considerable distance to the source of ignition and flash back.</p> <p>6.7 Ignition Temperature: 860°F</p> <p>6.8 Electrical Hazards: Not pertinent</p> <p>6.9 Burning Rate: 5.8 mm/min.</p> <p>6.10 Adiabatic Flame Temperature: Data Not Available</p> <p>(Continued)</p>	<p>10. HAZARD ASSESSMENT CODE</p> <p>(See Hazard Assessment Handbook)</p> <p>A-T-U</p>																																				
<p>7. CHEMICAL REACTIVITY</p> <p>7.1 Reactivity With Water: No reaction</p> <p>7.2 Reactivity with Common Materials: No reaction</p> <p>7.3 Stability During Transport: Stable</p> <p>7.4 Neutralizing Agents for Acids and Caustics: Not pertinent</p> <p>7.5 Polymerization: Not pertinent</p> <p>7.6 Inhibitor of Polymerization: Not pertinent</p> <p>7.7 Molar Ratio (Reactant to Product): Data Not Available</p> <p>7.8 Reactivity Group: 32</p>	<p>11. HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations: Flammable liquid</p> <p>11.2 NAS Hazard Rating for Bulk Water Transportation:</p> <table><thead><tr><th>Category</th><th>Rating</th></tr></thead><tbody><tr><td>Fire</td><td>3</td></tr><tr><td>Health</td><td></td></tr><tr><td>Vapor Irritant</td><td>2</td></tr><tr><td>Liquid or Solid Irritant</td><td>2</td></tr><tr><td>Poisons</td><td>2</td></tr><tr><td>Water Pollution</td><td></td></tr><tr><td>Human Toxicity</td><td>1</td></tr><tr><td>Aquatic Toxicity</td><td>3</td></tr><tr><td>Aesthetic Effect</td><td>2</td></tr><tr><td>Reactivity</td><td></td></tr><tr><td>Other Chemicals</td><td>1</td></tr><tr><td>Water</td><td>3</td></tr><tr><td>Self Reaction</td><td>0</td></tr></tbody></table> <p>11.3 NFPA Hazard Classification:</p> <table><thead><tr><th>Category</th><th>Classification</th></tr></thead><tbody><tr><td>Health Hazard (Blue)</td><td>2</td></tr><tr><td>Flammability (Red)</td><td>3</td></tr><tr><td>Reactivity (Yellow)</td><td>0</td></tr></tbody></table>	Category	Rating	Fire	3	Health		Vapor Irritant	2	Liquid or Solid Irritant	2	Poisons	2	Water Pollution		Human Toxicity	1	Aquatic Toxicity	3	Aesthetic Effect	2	Reactivity		Other Chemicals	1	Water	3	Self Reaction	0	Category	Classification	Health Hazard (Blue)	2	Flammability (Red)	3	Reactivity (Yellow)	0
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<p>8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 29 ppm/96 hr/buwal/TL<sub>50</sub>/fresh water</p> <p>8.2 Waterfowl Toxicity: Data not available</p> <p>8.3 Biological Oxygen Demand (BOD): 2.8% (theor.), 5 days</p> <p>8.4 Food Chain Concentration Potential: None</p>	<p>12. PHYSICAL AND CHEMICAL PROPERTIES</p> <p>12.1 Physical State at 15°C and 1 atm: Liquid</p> <p>12.2 Molecular Weight: 106.17</p> <p>12.3 Boiling Point at 1 atm: 277.2°F = 136.2°C = 409.4°F</p> <p>12.4 Freezing Point: -139°F = -95°C = 178°K</p> <p>12.5 Critical Temperature: 661.0°F = 343.9°C = 817.1°K</p> <p>12.6 Critical Pressure: 523 atm = 35.8 atm = 3.61 MM/Hg</p> <p>12.7 Specific Gravity: 0.867 at 20°C (liquid)</p> <p>12.8 Liquid Surface Tension: 29.2 dynes/cm = 0.0292 N/m at 20°C</p> <p>12.9 Liquid Water Interfacial Tension: 35.48 dynes/cm = 0.03548 N/m at 20°C</p> <p>12.10 Vapor (Gas) Specific Gravity: Not pertinent</p> <p>12.11 Ratio of Specific Heats of Vapor (Gas): 1.071</p> <p>12.12 Latent Heat of Vaporization: 144 Btu/lb = 80.1 cal/g = 3.35 X 10<sup>4</sup> J/kg</p> <p>12.13 Heat of Combustion: -17,780 Btu/lb = -8077 cal/g = -413.5 X 10<sup>3</sup> J/kg</p> <p>12.14 Heat of Decomposition: Not pertinent</p> <p>12.15 Heat of Solution: Not pertinent</p> <p>12.16 Heat of Polymerization: Not pertinent</p> <p>12.25 Heat of Fusion: Data Not Available</p> <p>12.26 Limiting Value: Data Not Available</p> <p>12.27 Reid Vapor Pressure: 0.4 psia</p>																																				
<p>9. SHIPPING INFORMATION</p> <p>9.1 Grades of Purity: Research grade: 99.96%, pure grade: 99.5%; technical grade: 99.0%</p> <p>9.2 Storage Temperature: Ambient</p> <p>9.3 Inert Atmosphere: No requirement</p> <p>9.4 Venting: Open (Rupture resistant) or pressure-vacuum</p>	<p>6. FIRE HAZARDS (Continued)</p> <p>6.11 Stoichiometric Air to Fuel Ratio: Data Not Available</p> <p>6.12 Flame Temperature: Data Not Available</p>																																				

**CSX TRANSPORTATION - ENVIRONMENTAL DEPARTMENT**  
**SAFETY RULES AND PROCEDURES WHILE ON CSXT PROPERTY**

Effective January 1, 1993, "The CSX Safe Way", a manual containing CSX Transportation's (CSXT) Safety Rules, mandatory Procedures for specific job activities and Recommended Practices, was revised. The following Rules, Procedures and Practices are excerpted for your guidance. While on CSXT property, all consultants, contractors and visitors must comply with these requirements.

**Safety Rules**

1. Consultant/Contractor must ensure that:
  - b) "job briefings are conducted prior to work activity and subsequently when activity changes."
  - c) "co-workers are warned of unsafe acts and hazards."
  - e) "safety rules, procedures and all company policies that relate to the job task are complied with."
  - f) "work place is drug and alcohol free."
  - g) "behavior in the work place is civil and courteous."
  - h) "local, state and federal laws and regulations that relate to the job tasks are observed."
  - i) "CSXT is informed of any accident and/or injury occurring while on CSXT property."
2. Consultant/Contractor "must wear personal protective equipment (see P-21 below) and clothing as required" and comply with applicable OSHA requirements.
6. "Do not attempt to mount, dismount, or cross over moving locomotives or cars."
14. "Seat belts must be worn while operating or riding in motor vehicles that are equipped with them."
16. "When working on or about tracks:
  - a) be alert for the movement of equipment at any time, in either direction, on any track;
  - b) do not cross within 25 feet of the end of standing equipment" . . .

**Note - Proper Protection:** Always ensure that a CSXT Flagman is present or the track is taken out of service by the proper CSXT authority, prior to starting any work on or about tracks!
17. "Do not cross over coupled, moving freight cars."
18. "Do not step, sit or stand on or in between any rail, switch, or part of the track structure unless proper protection is provided."
19. "Do not take refuge under any equipment."

## CSXT - Consultant Safety Guidelines

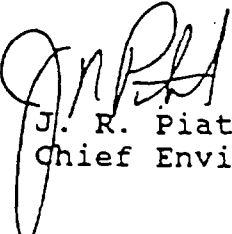
20. "Do not go under any equipment unless proper protection is provided."
27. "Ensure that your work area and environment are clean and orderly, and protected from controllable hazards."

Procedures and Recommendations

- P-18. "Mechanized Equipment - Procedures: Operator must:
- b. Sound a warning and reduce speed when view is restricted.
  - c. Wear seat belts where provided.
  - f. Use equipment clear of tracks unless protected.
  - g. Park equipment clear of tracks."
- P-21. "Personal Protective Equipment - Procedures:
- Consultants/Contractors . . .
- a. are required to wear head protection (i.e. - hard hat) at all times (except in an office or while riding in a highway motor vehicle)
  - b. must wear safety glasses with side shields at all times (except in an office or while riding in a highway motor vehicle)
  - c. when duties require them to work in areas where hearing protection is required, must have hearing protection devices available on their person; devices must be worn where required by posted notice or special instructions.
  - d. when working outside an office environment must wear safety toe shoes that lace up, have oil resistant soles and a distinct separation between the heel and the sole."

Note - all personal protective equipment is to be provided by the Consultant/Contractor!

Please copy and ensure that your employees (and all subcontractors), who are or will be working on or about CSX Transportation property, comply with these revised standards of safety conduct. If you have any questions, or need further clarification of anything listed above, please contact your project manager. If there's ever any doubt, the safe course must always be taken!

  
J. R. Piatak  
Chief Environmental Officer

**JOB #** \_\_\_\_\_

[illegible]

2007

# SITE AIR SURVEILLANCE RECORD

<b>SITE INFORMATION</b> CSX RADNOR yard Berm CTO #: SITE MANAGER: D. TATE			DATE: 9-8-94 H&S COORDINATOR: D.E.T		Page <u>1</u> of <u>2</u> SITE LOCATION: Franklin Brick / CSX yard	
<b>SITE CONDITIONS</b> TEMPERATURE: 72° RELATIVE HUMIDITY: 35° WIND SPEED & DIRECTION: Less Than 3 mph from SOUTH			<b>SITE PERSONNEL:</b> Larry Demoss George			
SAMPLE NO.	TIME	SAMPLE DESCRIPTION	LOCATION	INSTRUMENT	READING	COMMENTS
1	6:45	Air Broom Zone	S End Site	TE1 OVM	0.4	Gate near Perimeter
2	6:50	BZ Denis Drilling	Boring 2A	TE1 OVM	0.0	BZ Driller
3	8:05	"	"	"	3.0	"
4	9:05	"	Boring 2B	"	2.0	"
5	9:15	"	"	"	0.0	"
6	10:45	Perimeter Hole 3	Perimeter Boring 3 Area	"	5.0	Perimeter Boring 3 site
7	13:10	Boring 3 BZ	Breathing Zone of Driller		5.0	BZ of Driller
8	13:25	↓	↓	↓	2.0	↓
9	13:35	↓	↓	↓	4.2	↓
10	14:00	↓	↓	↓	3.6	↓

20 1595

SAMPLE NO.	TIME	SAMPLE DESCRIPTION	LOCATION	INSTRUMENT	READING	COMMENTS
11	14:15	Hole 3 BZ	Bratby zone of Driller	TEI OVM	1.5	NONE
12	14:30	"	"	"	2.6	↓
13	9-9-94 10:45	Hole 3A BZ	"	↓	0.0	
14	11:05	↓	↓	↓	0.8	
15	11:10	↓	↓	↓	0.0	
16	11:15	↓	↓	↓	0.0	
17	11:50	↓	↓	↓	3.4	
Completed		Drilling				

2 6 1597

# WORKPLACE EXPOSURE MONITORING RECORD

2 8

1593

Name: DOUGLAS TATE

Project No.: 3-4162-3000

Sec. No.: 086 38 9840

Project Name: CSX RADNOR BERM

Employer/Office: OGDEN NASHVILLE

Project Dates: 9-8-94 - 9-9-94

Job Function: Project EBN/H&S

Project Location: NASHVILLE TN

## SAMPLING METHOD:

- ☐ Adsorber: \_\_\_\_\_  
☒ Detector Tube: TCE  
☐ Dosimeter Badge: \_\_\_\_\_  
☐ Filter: \_\_\_\_\_  
☐ Impinger: \_\_\_\_\_  
☐ Meter: \_\_\_\_\_  
☐ Other: \_\_\_\_\_

## SAMPLE TYPE:

- ☒ Area  
☐ Background  
☐ Biological  
☐ Personal

## WORK ZONE:

- ☐ Contamination Reduction  
☒ Exclusion  
☐ Support  
☐ Other \_\_\_\_\_

## SAMPLE COLLECTION:

Sample No.: 1 Sample Duration: \_\_\_\_\_ (min.)  
 Instrument Make/Model: DRAGER Tube Sample Rate: \_\_\_\_\_ (L/min.)  
 Calibration Date: \_\_\_\_\_ Sample Vol.: \_\_\_\_\_ (L)

Sample Date: 9-8-94

Collected By: D. Tate

Analyzed By: D. Tate

(See reverse side for calculations and sketches as necessary.)

## ATMOSPHERIC CONDITIONS:

Humidity (%): ☐ Low 0-30 ☒ Med 30-70 ☐ High 70-100  
 Wind (mph): ☒ Light 0-5 ☐ Moderate 5-20 ☐ High >20  
 Temp.: 85 °F Direction: S

## ANALYTICAL RESULTS:

Contaminant	Concentration	Units	Analytical Method	Detection Limit
TCE	None Detected	PPM	Drager Tube	

## PPE WORN: (✓=Yes)

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Half-Face Purifying Respirator | <input type="checkbox"/> Disposable Coverall | <input checked="" type="checkbox"/> Safety Glasses        |
| <input type="checkbox"/> Full-Face Purifying Respirator | <input type="checkbox"/> Chemical Gloves     | <input type="checkbox"/> Goggles                          |
| <input type="checkbox"/> Air Supplied Respirator        | <input type="checkbox"/> Chemical Boots      | <input checked="" type="checkbox"/> Hearing Protection    |
| <input type="checkbox"/> Disposable Respirator          | <input type="checkbox"/> Slicker             | <input checked="" type="checkbox"/> Other <u>HARD HAT</u> |
| <input type="checkbox"/> Chemical Cartridge             | <input type="checkbox"/> Unknown             | <u>Street Shoe Socks</u>                                  |
| <input type="checkbox"/> HEPA Cartridge                 |  |   |

## OTHER REPRESENTATIVE PERSONNEL:

LARRY DEMISS  
GEORGE LAWRENCE

## GENERAL COMMENTS:

NO TCE DETECTED w/  
DRAGER Tube

## FIRST AID INCIDENT REPORT

Date of Report:

Date of Accident/Incident:

Report Completed by:

Description of the Accident/Incident: (time, location, event, description of injuries)

Name of Injured Person:

Employer:

Name of First Aid Providers(s):

Social Security No.:

Bloodborne Pathogen Exposure Incident Evaluation:

1. Was the First Aid Responder exposed to blood or other potentially infectious materials?

- ☐ Exposure Occurred (see question 2)  
☐ No Exposure

2. Exposure occurred by contact with the following (check all that apply):

- |  |  |
|--|--|
| <input type="checkbox"/> Eye                   | <input type="checkbox"/> Non Intact Skin (cuts, abrasions) |
| <input type="checkbox"/> Mouth                 | <input type="checkbox"/> Needlestick                       |
| <input type="checkbox"/> Other Mucous Membrane | <input type="checkbox"/> Human Bite                        |

Exposure Control Precautions Taken (check all that apply):

- |  |   |
|--|---|
| <input type="checkbox"/> Gloves            | <input type="checkbox"/> Immediate Personal Hygiene       |
| <input type="checkbox"/> Face Mask         | <input type="checkbox"/> Previous HBV Immunization        |
| <input type="checkbox"/> One-way CPR valve | <input type="checkbox"/> Recommended for HBV Immunization |
| <input type="checkbox"/> Eye Protection    | <input type="checkbox"/> Other _____                      |

Please attach this completed form to the Supervisor's First Report of Injury and forward to Human Resources and your Office Health and Safety Coordinator or, as applicable, to the CLEAN Health and Safety Manager (HSM).



N In order to prevent accidents, it is necessary to know how and why they occur. State facts as accurately as possible.  
 O Accurate reporting of all facts will help in the preparation of the "Employer's Report." Submit your complete report within  
 T 24 hours. If additional space is needed, use reverse side.  
 E

Name of Injured Employee		Department in Which Regularly Employed
Injury Date	Time a.m. p.m.	Date Employer was Notified of Injury
Did Accident Occur on Employer's Premises? <input type="checkbox"/> Yes <input type="checkbox"/> No	Where? (Specify dept., job site, etc.)	Name of witnesses.
What was employee doing when injured? (Such as: walking, lifting, operating machines, etc.) Be specific		
Please describe fully the events that resulted in injury or occupational disease. Tell what happened and how it happened? (Do not describe nature of injury.)		
What machine, tool, substance or object was most closely connected with the injury? (e.g., the machine employee struck against or which stuck him; the chemical that irritated his skin; in cases of strain, the thing he was lifting, pulling, etc.)		
Nature of injury and part of body affected.		
CAUSES OF ACCIDENT: CHECK ALL THAT APPLY		
<p><b>UNSAFE BUILDING OR WORKING CONDITIONS</b></p> <p><input type="checkbox"/> LAYOUT OF OPERATIONS</p> <p><input type="checkbox"/> LAYOUT OF MACHINERY</p> <p><input type="checkbox"/> (UNSAFE PROCESSES</p> <p><input type="checkbox"/> IMPROPER VENTILATION</p> <p><input type="checkbox"/> IMPROPER SANITATION/HYGIENE</p> <p><input type="checkbox"/> IMPROPER LIGHT</p> <p><input type="checkbox"/> EXCESSIVE NOISE</p> <p><input type="checkbox"/> FLOORS OR PLATFORMS</p> <p><input type="checkbox"/> MISCELLANEOUS</p> <p><b>HOUSEKEEPING</b></p> <p><input type="checkbox"/> IMPROPERLY PILED OR STORED MATERIAL</p> <p><input type="checkbox"/> CONGESTION</p> <p><b>PHYSICAL HAZARDS OR EQUIPMENT</b></p> <p><input type="checkbox"/> INEFFECTIVELY GUARDED</p> <p><input type="checkbox"/> UNGUARDED</p> <p><input type="checkbox"/> GUARD REMOVED</p> <p><input type="checkbox"/> DEFECTIVE TOOLS</p> <p><input type="checkbox"/> DEFECTIVE MACHINES</p> <p><input type="checkbox"/> DEFECTIVE MATERIALS</p>	<p><b>INSTRUCTIONS AND TRAINING</b></p> <p><input type="checkbox"/> NONE</p> <p><input type="checkbox"/> INCOMPLETE</p> <p><input type="checkbox"/> ERRONEOUS</p> <p><input type="checkbox"/> NOT FOLLOWING INSTRUCTIONS</p> <p><input type="checkbox"/> OPERATING WITHOUT AUTHORITY</p> <p><input type="checkbox"/> WORKING AT UNSAFE SPEED</p> <p><input type="checkbox"/> INEXPERIENCE</p> <p><input type="checkbox"/> UNTRAINED IN PROCEDURE</p> <p><input type="checkbox"/> INCORRECT USE OF TOOL OR EQUIPMENT</p> <p><input type="checkbox"/> IMPROPER JUDGMENT</p> <p><input type="checkbox"/> IMPROPER LIFTING</p> <p><input type="checkbox"/> LIFTING EXCESSIVE WEIGHT</p> <p><b>DISCIPLINE</b></p> <p><input type="checkbox"/> NOT FOLLOWING SAFETY RULES</p> <p><input type="checkbox"/> HORSEPLAY</p> <p><b>APPAREL OR PERSONAL PROTECTIVE EQUIPMENT</b></p> <p><input type="checkbox"/> PROTECTIVE EQUIPMENT NOT USED</p> <p><input type="checkbox"/> UNSUITABLE PROTECTIVE EQUIPMENT</p> <p><input type="checkbox"/> UNSUITABLE CLOTHING OR FOOTWEAR</p>	
What can be done to prevent such an accident from happening again?		
Approx. date condition will be corrected?	Signature of Supervisor:	Date:

## HEPATITIS B (HBV) VACCINATION DECLINATION

In accordance with 29 CFR 1910.1030, I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with the hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

---

Signature

---

Date

---

Printed Name

Distribution:

Corporate Health and Safety Manager  
CLEAN Health and Safety Manager  
Human Resources Manager

Ogden Environmental and Energy Services Co., Inc.  
PACDIV CLEAN Program  
CTO \_\_\_\_\_, Title

\_\_\_\_\_ Health and Safety Plan  
Date: January 1994  
Page: 40 of 43

**Exposure Control (See Also Appendix 8):**

Universal Precautions: Use of the Center for Disease Control "Universal Precautions" as an approach to infection control, which assumes that all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

Personal Protection Equipment: While rendering first aid where exposure to blood may occur, Ogden employees will don, as a minimum, latex or blue nitrile gloves. Latex gloves will be available in the field first aid kit in a packet marked Vital 1 Econo-Kit. Other items included in the Vital 1 Econo-Kit that are to be used to control the "spill" are Vital 1 absorbent beads, a plastic scooper, a biohazard bag for waste, and surface disinfecting and hand cleaning towelettes. Other suggested PPE in the event of a serious blood-producing injury include safety glasses, Tyvek™ coveralls, boot covers, and nitrile outer gloves - all of which should be available onsite. In addition, one-way CPR mask to prevent direct contact between the rescuer and recipient, will also be available in the first aid kit should the need arise.

Hepatitis B Vaccination: First aid providers to jobsite injuries do not need to receive a pre-exposure Hepatitis B vaccine. However, all first aid providers assessing in any situation involving the presence of blood - regardless of whether or not a specific exposure incident occurred - must be offered the full Hepatitis B immunization series no later than 24 hours after an incident. On Oahu, this immunization series can be obtained by calling the Straub Immunization Clinic at 522-4553 or going directly to the clinic at 839 S. Beretania St. in Honolulu.

Exposure Incident Evaluation: All first aid incidents involving exposures must be reported to the HSM before the end of the work shift in which the incident occurs. A First Aid Incident Report must be completed describing the circumstances of the accident and response in addition to the Supervisor's Report of Accident Form. Following a report of an exposure incident, Ogden shall provide to the exposed employee monitoring for HIV or HBV antibodies and medical counseling in cases of positive tests for HIV or HBV.

**Waste Disposal:**

Should biohazardous waste be generated as a result of a field related injury, the "contaminated" waste and area will be cleaned to the extent possible with items provided in the Vital 1 Econo-Kit and arrangements for the pick-up and final disposal of the waste will be made by calling either Garrett Kujima at Hawaii Bio-Waste Systems, Inc. at 841-1240 or Nick Wong at NCNS Environmental, Inc. at 847-7875.

**HBV Vaccination Declination:**

For whatever reason (religious, personal, or otherwise), employees may decline or refuse the HBV vaccination, by contacting the HSM. In instances where the vaccination is required, the employee will be required to sign a waiver (Attachment 2) indicating he/she has chosen at that time to refuse the vaccination, but may elect to do so in the future at no expense to him/her.

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**APPENDIX 3**  
**LABORATORY TEST RESULTS**

# SUMMARY OF LABORATORY TEST RESULTS

					PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY	ATTERBERG LIMITS				Project: <u>CSX Radnor Yard - Berm</u> Project Number: <u>3-4162-3000-0005</u> Date: <u>October 5, 1994</u>
Hole No.	Sample No.	Sample Type*	Depth (ft)	Natural Moisture (%)		G <sub>s</sub>	Liquid Limit (%)	Plasticity Index (%)	Unified Soil Classification	Other Test **	Soil Description
2B	2	SS	6.5-8.0	20.5	56.4	2.59	37	20	CL	S	CLAY, silty, sandy, brown with rock fragments (fill)
2D	1	SS	3.0-5.0	26.3	73.9	2.63	42	23	CL	S	CLAY, silty, brown (fill)
2D	4	SS	25.0-27.0	25.2	66.8	2.54	51	30	CH	S	CLAY, silty, sandy, yellowish-brown
3A	2	SS	10.0-11.5	25.8	72.0		45	23	CL	S	CLAY, silty, brown with rock fragments (fill)
3A	4	SS	20.0-21.5	23.4	66.9	2.54		NE		S	CLAY, silty, slightly sandy-brown (fill)
3A	1	ST	25.0-27.0	23.8		2.65	41	19	CL	T	CLAY, silty, brown to dark brown mottled tan and grayish-brown
3A	5	SS	27.0-28.5	23.6	70.7		52	29	CH	S	CLAY, silty, slightly sandy, light reddish-brown with sand stone fragments
3A	2	ST	30.0-32.0	27.3		2.68	38	21	CL	T	CLAY, silty, slightly sandy dark brown to brown mottled grayish brown
3A	6	SS	32.0-33.5	29.8	41.1	2.67	38	19	SC	S	SAND, clayey, slightly silty, yellowish-brown

\*ST-SHELBY TUBE SAMPLE, SS-SPLIT SPOON SAMPLE, C-COMPOSITE SPLIT SPOON

\*\*TEST RESULTS REPORTED ON OTHER SHEETS:

C-CONSOLIDATION

S-SIEVE OR GRAIN SIZE ANALYSIS

U-UNCONFINED COMPRESSION TEST

K-PERMEABILITY

NE-NOT ENOUGH SAMPLE FOR TEST

P-PROCTOR TEST

D-DIRECT SHEAR TEST

T-TRIAXIAL TEST

DATA CHECKED BY

DET

OGDEN Technical Services

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0  
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0  
4

## UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TESTS ONLY

Client : CSX TRANSPORTATION

Project : CSX RADNOR YARD BEEM

Project No. : 3-4162 Date : 10/94

Sample Description : CLAY, SILTY, DK BR MOTT TAN

## TEST DATA

	TEST 1	TEST 2
Boring No./Sample No.	3A/ST1	3A/ST1
Depth	25.0-27.0	25.0-27.0
Consolidation Pressure (psf)	5	15
Specific Gravity	2.65	2.65

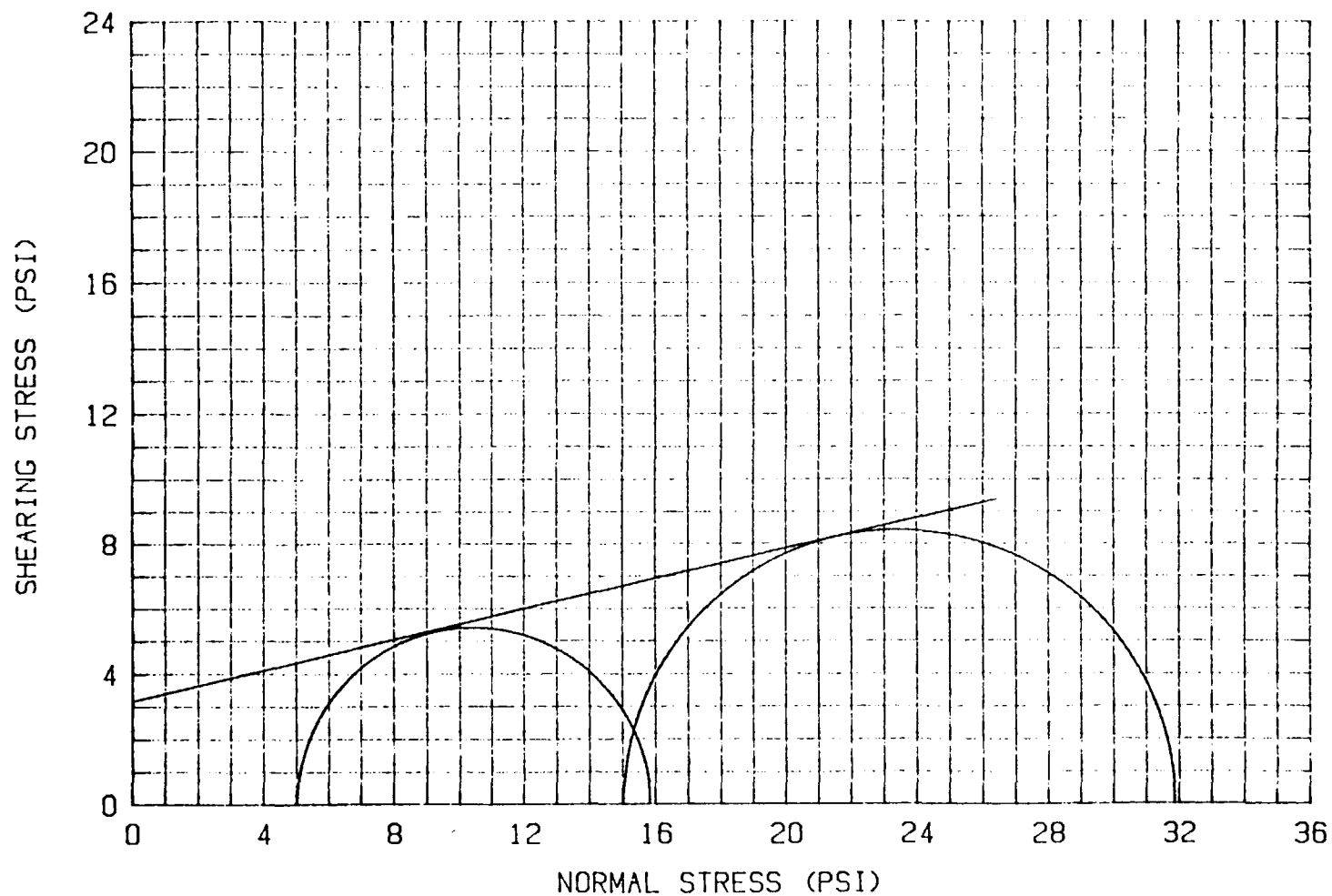
## INITIAL SAMPLE PROPERTIES

Moist Unit Weight, (pcf)	120.6	125.8
Dry Unit Weight, (pcf)	97.5	101.6
Moisture Content, (%)	23.8	23.8
Volume, (cu. ft.)	.0208	.0208
Void Ratio	.697	.628
Saturation, (%)	90.5	100.4

## FINAL SAMPLE PROPERTIES

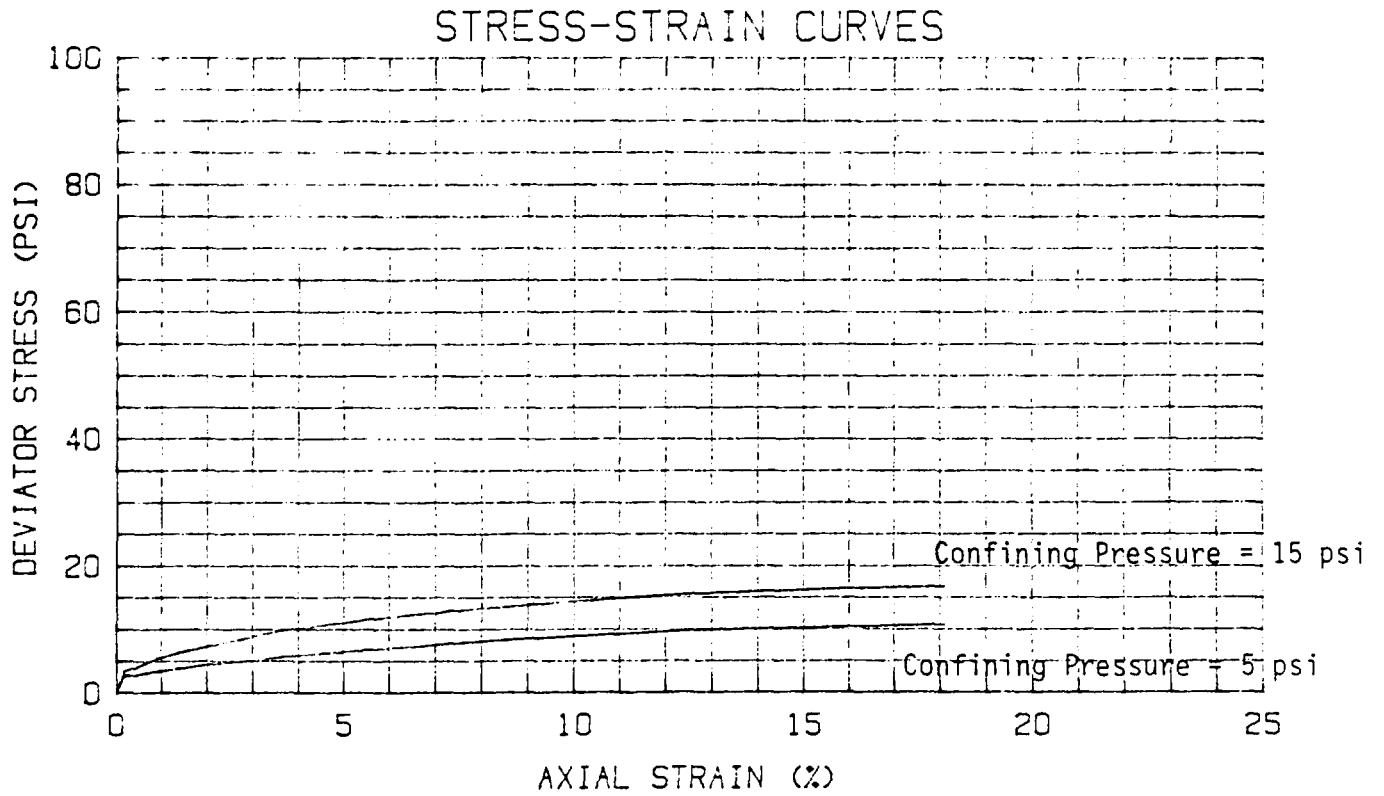
Moist Unit Weight, (pcf)	120.6	125.8
Dry Unit Weight, (pcf)	97.5	101.6
Moisture Content, (%)	23.8	23.8
Volume, (cu. ft.)	.0208	.0208
Void Ratio	.697	.628
Saturation, (%)	90.5	100.4

# MOHR DIAGRAMS UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST (U-U)



COHESION (c) 3.4 psi (489 psf) PROJECT CSX Radnor Yard - Berm  
 ANGLE OF INTERNAL FRICTION ( $\phi$ ) 12.7° HOLE 3A SAMPLE UD ST-1

2 6 1607



COHESION (c) 3.4psi (489psf) PROJECT CSX Radnor Yard - Berm

ANGLE OF INTERNAL FRICTION (φ) 12.7° HOLE 3A SAMPLE UD ST-1



## UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TESTS (UU)

Client : CSX TRANSPORTATION  
 Project : CSX RADNOR YARD BERM  
 Project No. : 3-4152 Date : 10/94  
 Sample Description : CLAY, SILTY, BROWN

## TEST DATA

	TEST 1	TEST 2	TEST 3
	-----	-----	-----
Boring No./Sample No.	3A/ST2	3A/ST2	3A/ST2
Depth	30.0-32.0	30.0-32.0	30.0-32.0
Consolidation Pressure (psi)	5	10	15
Specific Gravity	2.68	2.68	2.68

## INITIAL SAMPLE PROPERTIES

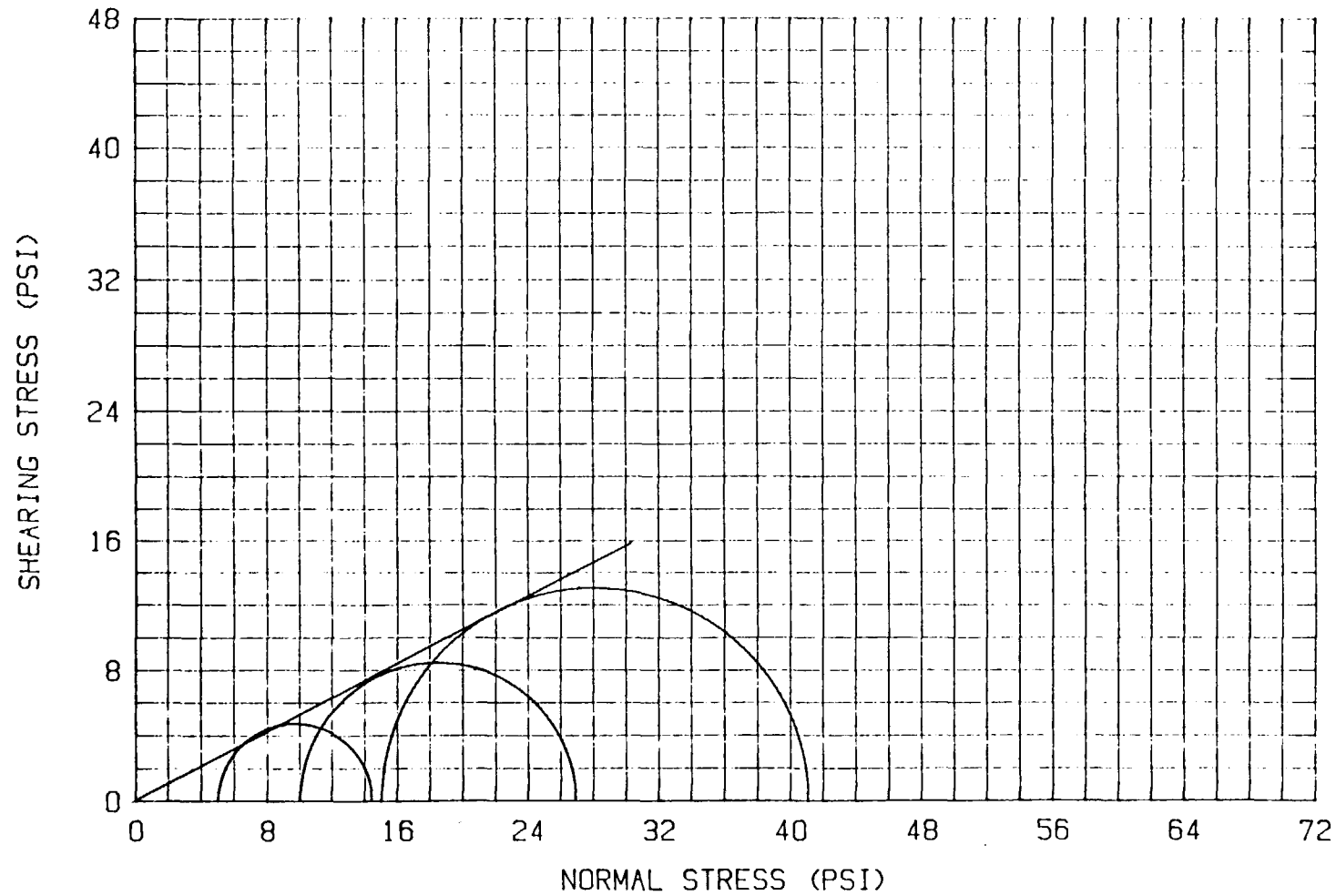
Moist Unit Weight, (pcf)	124.5	119.9	121.2
Dry Unit Weight, (pcf)	97.8	94.2	95.2
Moisture Content, (%)	27.3	27.3	27.3
Volume, (cu. ft.)	.0208	.0208	.0208
Void Ratio	.710	.775	.757
Saturation, (%)	103.1	94.4	96.6

## FINAL SAMPLE PROPERTIES

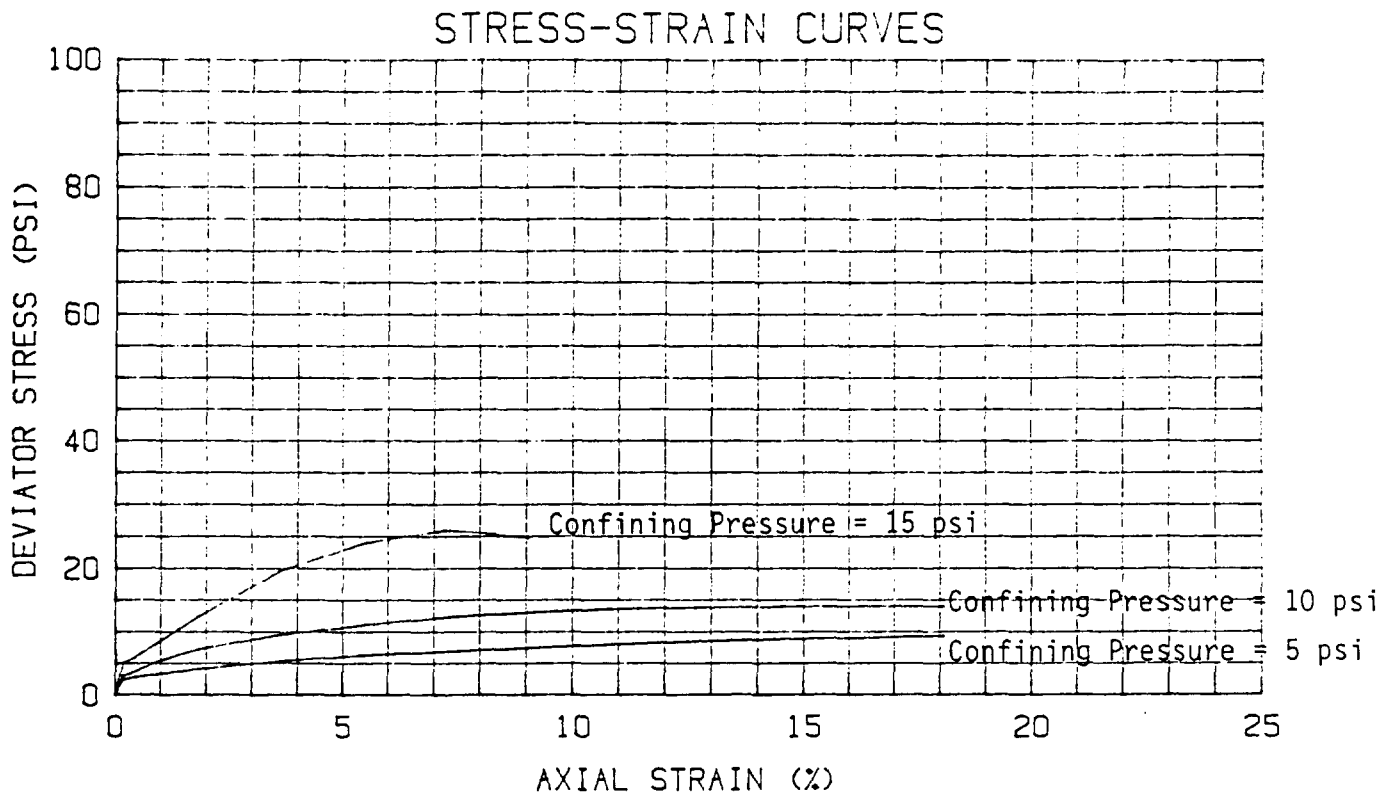
Moist Unit Weight, (pcf)	124.5	119.9	121.2
Dry Unit Weight, (pcf)	97.8	94.2	95.2
Moisture Content, (%)	27.3	27.3	27.3
Volume, (cu. ft.)	.0208	.0208	.0208
Void Ratio	.710	.775	.757
Saturation, (%)	103.1	94.4	96.6

# MOHR DIAGRAMS

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST (U-U)



COHESION (c) 0 psi PROJECT CSX Radnor Yard - Berm  
 ANGLE OF INTERNAL FRICTION ( $\phi$ ) 27.8° HOLE 3A SAMPLE UD ST-2



COHESION (c) 0 psi PROJECT CSX Radnor Yard - Berm

ANGLE OF INTERNAL FRICTION ( $\phi$ ) 27.8° HOLE 3A SAMPLE UD ST-2



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SIGNATURE PAGE

Reviewed by:

  
ATI Project Manager

Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
NASHVILLE, TENNESSEE

Project Name: CSX RADNOR YARD  
Project Number: 3-4162-3000  
Project Location: NASHVILLE, TN.  
Accession Number: 409518

Project Manager: BERNIE VOOR  
Sampled By: DOUG TATE

2 8

1612

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

# Analysis Report

Analysis: RCRA METALS

Accession: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Department: METALS

26 1613

[0] Page 1  
Date 28-Sep-94

"FINAL REPORT FORMAT - SINGLE"

Accession: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Test: RCRA METALS  
Matrix: WATER  
QC Level: II

Lab Id: 001 Sample Date/Time: 14-SEP-94 1258  
Client Sample Id: WASH WATER Received Date: 15-SEP-94

Parameters:	Units:	Results:	Rpt Lmts:	Q:	Batch:	Analyst:
SILVER (6010)	MG/L	ND	0.01		A6W270	JRR
ARSENIC (7060)	MG/L	0.014	0.010	*	R7W319	CD
BARIUM (6010)	MG/L	0.29	0.01		B6W270	JRR
CADMIUM (6010)	MG/L	ND	0.005		C6W270	JRR
CHROMIUM (6010)	MG/L	0.03	0.01		H6W270	JRR
MERCURY (7470)	MG/L	ND	0.0002		M7W110	JP
LEAD (7421)	MG/L	0.049	0.003		P7W319	CD
SELENIUM (7740)	MG/L	ND	0.005		S7W319	SL

Comments:

28 1614

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 2  
Date 28-Sep-94

## "FINAL REPORT FORMAT - SINGLE"

Accession: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Test: RCRA METALS  
Matrix: SOIL  
QC Level: II

Lab Id: 002  
Client Sample Id: SPOIL SOIL

Sample Date/Time: 14-SEP-94 1312  
Received Date: 15-SEP-94

Parameters:	Units:	Results:	Rpt Lmts:	Q:	Batch:	Analyst:
SILVER (6010)	MG/KG	ND	1		A6S207	JRR
ARSENIC (6010)	MG/KG	57	5		R6S207	JRR
BARIUM (6010)	MG/KG	200	1		B6S207	JRR
CADMIUM (6010)	MG/KG	ND	0.5		C6S207	JRR
CHROMIUM (6010)	MG/KG	16	1		H6S207	JRR
MERCURY (7471)	MG/KG	0.1	0.1		M4S092	GJ
LEAD (6010)	MG/KG	17	5		P6S207	JRR
SELENIUM (6010)	MG/KG	ND	10		S6S207	JRR

Comments:

## "Method Report Summary"

Accession Number: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Test: RCRA METALS

Client Sample Id:	Parameter:	Unit:	Result:
WASH WATER	ARSENIC (7060)	MG/L	0.014
	BARIUM (6010)	MG/L	0.29
	CHROMIUM (6010)	MG/L	0.03
	LEAD (7421)	MG/L	0.049
SPOIL SOIL	ARSENIC (6010)	MG/KG	57
	BARIUM (6010)	MG/KG	200
	CHROMIUM (6010)	MG/KG	16
	MERCURY (7471)	MG/KG	0.1
	LEAD (6010)	MG/KG	17



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ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

Analysis Report

Analysis: TCO / PETRO. HYDROCARBON RANGE C6-C32

Accession: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Department: SEMI-VOLATILE FUELS

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 1  
Date 06-Oct-94

"FINAL REPORT FORMAT - SINGLE"

Accession: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Test: TCO / PETRO. HYDROCARBON RANGE C6-C32  
Analysis Method: TCO / 8015 - SW 846, EPA UST Work Group Nov. 1990, Mod. 8015  
Extraction Method: 3510/SW-846, 3rd Edition, September 1986 and Revision 1, July 1992  
Matrix: WATER  
QC Level: I

Lab Id:	001	Sample Date/Time:	14-SEP-94 1258
Client Sample Id:	WASH WATER	Received Date:	15-SEP-94
Batch: FPW205		Extraction Date:	19-SEP-94
Blank: A	Dry Weight %: N/A	Analysis Date:	29-SEP-94

Parameter:	Units:	Results:	Rpt Lmts:	Q:
TOTAL PETROLEUM HYDROCARBON	UG/L	600	100	
HYDROCARBONS QUANTITATED USING	N/A	(+)		
ORTHO TER PHENYL	%REC/SURR	81	81-141	
ANALYST	INITIALS	SJF		

Comments:  
(+) UNIDENTIFIABLE HYDROCARBONS IN THE DRO RANGE C10-C28.

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

(0) Page 2  
Date 06-Oct-94

## "FINAL REPORT FORMAT - SINGLE"

Accession: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Test: TCO / PETRO. HYDROCARBON RANGE C6-C32  
Analysis Method: TCO / 8015 - SW 846, EPA UST Work Group Nov. 1990, Mod. 8015  
Extraction Method: 3550/SW-846, 3rd Edition, September 1986 and Revision 1, July 1992  
Matrix: SOIL  
QC Level: I

---

Lab Id:	002	Sample Date/Time:	14-SEP-94 1312
Client Sample Id:	SPOIL SOIL	Received Date:	15-SEP-94
Batch: FPS204		Extraction Date:	19-SEP-94
Blank: B	Dry Weight %: 79	Analysis Date:	29-SEP-94

Parameter:	Units:	Results:	Rpt Lmts:	Q:
TOTAL PETROLEUM HYDROCARBON	MG/KG	20	3.2	
HYDROCARBONS QUANTITATED USING	N/A	(+)		
ORTHO TER PHENYL	%REC/SURR	118	65-135	
ANALYST	INITIALS	SJF		

Comments:  
(+) UNIDENTIFIABLE HYDROCARBONS IN THE DRO RANGE C10-C28.

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

(0) Page 3  
Date 06-Oct-94

## "Method Report Summary"

Accession Number: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Test: TCO / PETRO. HYDROCARBON RANGE C6-C32

---

Client Sample Id:	Parameter:	Unit:	Result:
WASH WATER	TOTAL PETROLEUM HYDROCARBON	UG/L	600
	HYDROCARBONS QUANTITATED USING	N/A	(+)
SPOIL SOIL	TOTAL PETROLEUM HYDROCARBON	MG/KG	20
	HYDROCARBONS QUANTITATED USING	N/A	(+)

ANALYTICAL TECHNOLOGIES, INC.

11 East Olive Road

Pensacola, Florida 32514

(904) 474-1001

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1620

# Analysis Report

Analysis: PESTICIDES (8080)

Accession:	409518
Client:	OGDEN ENVIRONMENTAL AND ENERGY SERVICES
Project Number:	3-4162-3000
Project Name:	CSX RADNOR YARD
Project Location:	NASHVILLE, TN.
Department:	PESTICIDES

28 1621

[0] Page 1  
Date 04-Oct-94

## "FINAL REPORT FORMAT - SINGLE"

Accession: 409518  
 Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
 Project Number: 3-4162-3000  
 Project Name: CSX RADNOR YARD  
 Project Location: NASHVILLE, TN.  
 Test: PESTICIDES (8080)  
 Analysis Method: 8080 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992.  
 Extraction Method: 3550 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992.  
 Matrix: SOIL  
 QC Level: II

Lab Id:	002	Sample Date/Time:	14-SEP-94 1312
Client Sample Id:	SPOIL SOIL	Received Date:	15-SEP-94
Batch: PSS212		Extraction Date:	24-SEP-94
Blank: B	Dry Weight %: 79	Analysis Date:	03-OCT-94

Parameter:	Units:	Results:	Rpt Lmts:	Q:
ALDRIN	UG/KG	ND	2.2	
ALPHA-BHC	UG/KG	ND	2.2	
BETA-BHC	UG/KG	ND	2.2	
DELTA-BHC	UG/KG	ND	2.2	
GAMMA-BHC (LINDANE)	UG/KG	ND	2.2	
CHLORDANE	UG/KG	ND	22	
4,4'-DDD	UG/KG	ND	4.2	
4,4'-DDE	UG/KG	ND	4.2	
4,4'-DDT	UG/KG	ND	4.2	
DIELDRIN	UG/KG	ND	4.2	
ENDOSULFAN I	UG/KG	ND	2.2	
ENDOSULFAN II	UG/KG	ND	4.2	
ENDOSULFAN SULFATE	UG/KG	ND	4.2	
ENDRIN	UG/KG	ND	4.2	
ENDRIN ALDEHYDE	UG/KG	ND	4.2	
HEPTACHLOR	UG/KG	ND	2.2	
HEPTACHLOR EPOXIDE	UG/KG	ND	2.2	
PCB-1016	UG/KG	ND	42	
PCB-1221	UG/KG	ND	42	
PCB-1232	UG/KG	ND	42	
PCB-1242	UG/KG	ND	42	
PCB-1248	UG/KG	ND	42	
PCB-1254	UG/KG	ND	42	
PCB-1260	UG/KG	ND	42	
TOXAPHENE	UG/KG	ND	130	
METHOXYCHLOR	UG/KG	ND	22	
DCB	%REC/SURR	80	20-150	
TCMX	%REC/SURR	74	20-140	
ANALYST	INITIALS	RP		

Comments:

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ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

Analysis Report

Analysis: PESTICIDES (608)

Accession:	409518
Client:	OGDEN ENVIRONMENTAL AND ENERGY SERVICES
Project Number:	3-4162-3000
Project Name:	CSX RADNOR YARD
Project Location:	NASHVILLE, TN.
Department:	PESTICIDES

2 8 1623

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 1  
Date 26-Sep-94

## "FINAL REPORT FORMAT - SINGLE"

Accession: 409518  
 Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
 Project Number: 3-4162-3000  
 Project Name: CSX RADNOR YARD  
 Project Location: NASHVILLE, TN.  
 Test: PESTICIDES (608)  
 Analysis Method: 608 / Federal Register 40 CFR, Part 136, July 1, 1992  
 Extraction Method: 608 / Federal Register 40 CFR, Part 136, July 1, 1992  
 Matrix: WATER  
 QC Level: II

Lab Id:	001	Sample Date/Time:	14-SEP-94 1258
Client Sample Id:	WASH WATER	Received Date:	15-SEP-94
Batch: PSW207		Extraction Date:	20-SEP-94
Blank: B	Dry Weight %: N/A	Analysis Date:	22-SEP-94

Parameter:	Units:	Results:	Rpt Lmts:	Q:
ALDRIN	UG/L	ND	0.05	
ALPHA-BHC	UG/L	ND	0.05	
BETA-BHC	UG/L	ND	0.05	
DELTA-BHC	UG/L	ND	0.05	
GAMMA-BHC (LINDANE)	UG/L	ND	0.05	
4,4'-DDD	UG/L	ND	0.10	
4,4'-DDE	UG/L	ND	0.10	
4,4'-DDT	UG/L	ND	0.10	
DIELDRIN	UG/L	ND	0.10	
ENDOSULFAN I	UG/L	ND	0.05	
ENDOSULFAN II	UG/L	ND	0.10	
ENDOSULFAN SULFATE	UG/L	ND	0.10	
ENDRIN	UG/L	ND	0.10	
ENDRIN ALDEHYDE	UG/L	ND	0.10	
HEPTACHLOR	UG/L	ND	0.05	
HEPTACHLOR EPOXIDE	UG/L	ND	0.05	
PCB-1016	UG/L	ND	1.0	
PCB-1221	UG/L	ND	1.0	
PCB-1232	UG/L	ND	1.0	
PCB-1242	UG/L	ND	1.0	
PCB-1248	UG/L	ND	1.0	
PCB-1254	UG/L	ND	1.0	
PCB-1260	UG/L	ND	1.0	
CHLORDANE	UG/L	ND	0.5	
TOXAPHENE	UG/L	ND	3.0	
DCB	%REC/SURR	67	20-150	
TCMX	%REC/SURR	75	20-140	
ANALYST	INITIALS	RP		

Comments:



2 6 1624

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

### Analysis Report

Analysis: VOLATILES (8240)

Accession: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Department: ORGANIC/MS

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

{0} Page 1  
Date 03-Oct-94

## "FINAL REPORT FORMAT - SINGLE"

Accession: 409518  
 Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
 Project Number: 3-4162-3000  
 Project Name: CSX RADNOR YARD  
 Project Location: NASHVILLE, TN.  
 Test: VOLATILES (8240)  
 Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
 Extraction Method: N/A  
 Matrix: WATER  
 QC Level: II

Lab Id: 001  
 Client Sample Id: WASH WATER  
 Sample Date/Time: 14-SEP-94 1258  
 Received Date: 15-SEP-94

Batch: BUW009  
 Blank: B  
 Dry Weight %: N/A  
 Extraction Date: N/A  
 Analysis Date: 24-SEP-94

Parameter:	Units:	Results:	Rpt Lmts:	Q:
ACETONE	UG/L	ND	10	
ACROLEIN	UG/L	ND	100	
ACRYLONITRILE	UG/L	ND	100	
BENZENE	UG/L	ND	1	
BROMODICHLOROMETHANE	UG/L	ND	1	
BROMOFORM	UG/L	ND	2	
BROMOMETHANE	UG/L	ND	1	
2-BUTANONE (MEK)	UG/L	ND	3	
CARBON DISULFIDE	UG/L	ND	1	
CARBON TETRACHLORIDE	UG/L	ND	2	
CHLOROBENZENE	UG/L	ND	1	
CHLOROETHANE	UG/L	ND	1	
2-CHLOROETHYL VINYL ETHER	UG/L	ND	5	
CHLOROFORM	UG/L	ND	2	
CHLOROMETHANE	UG/L	ND	2	
CHLORODIBROMOMETHANE	UG/L	ND	5	
DIBROMOMETHANE	UG/L	ND	5	
DICHLORODIFLUOROMETHANE	UG/L	ND	5	
1,1-DICHLOROETHANE	UG/L	ND	1	
1,2-DICHLOROETHANE	UG/L	ND	2	
1,1-DICHLOROETHENE	UG/L	ND	1	
TOTAL 1,2-DICHLOROETHYLENE	UG/L	ND	5	
1,2-DICHLOROPROPANE	UG/L	ND	2	
CIS-1,3-DICHLOROPROPENE	UG/L	ND	1	
TRANS-1,3-DICHLOROPROPENE	UG/L	ND	1	
1,4-DICHLORO-2-BUTENE	UG/L	ND	5	
ETHYL BENZENE	UG/L	ND	1	
ETHYL METHACRYLATE	UG/L	ND	5	
2-HEXANONE	UG/L	ND	3	
IODOMETHANE	UG/L	ND	5	
METHYLENE CHLORIDE	UG/L	ND	3	
4-METHYL-2-PENTANONE	UG/L	ND	3	
STYRENE	UG/L	ND	2	
1,1,2,2-TETRACHLOROETHANE	UG/L	ND	2	
TETRACHLOROETHENE	UG/L	ND	1	
TOLUENE	UG/L	ND	5	
1,1,1-TRICHLOROETHANE	UG/L	ND	5	
1,1,2-TRICHLOROETHANE	UG/L	ND	2	
TRICHLOROETHENE	UG/L	ND	1	
TRICHLOROFLUOROMETHANE	UG/L	ND	1	

28 1826

[0] Page 2  
Date 03-Oct-94

## "FINAL REPORT FORMAT - SINGLE"

Accession: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Test: VOLATILES (8240)  
Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
Extraction Method: N/A  
Matrix: WATER  
QC Level: II

Lab Id: 001 Sample Date/Time: 14-SEP-94 1258  
Client Sample Id: WASH WATER Received Date: 15-SEP-94

Parameter:	Units:	Results:	Rpt Lmts:	Q:
1,2,3 TRICHLOROPROPANE	UG/L	ND	5	
VINYL ACETATE	UG/L	ND	2	
VINYL CHLORIDE	UG/L	ND	1	
TOTAL XYLENES	UG/L	ND	2	
BROMOFLUOROBENZENE	%REC/SURR	101	82-115	
1,2-DICHLOROETHANE-D4	%REC/SURR	91	76-114	
TOLUENE-D8	%REC/SURR	100	88-115	
ANALYST	INITIALS	LP		

Comments:

## "FINAL REPORT FORMAT - SINGLE"

Accession: 409518  
 Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
 Project Number: 3-4162-3000  
 Project Name: CSX RADNOR YARD  
 Project Location: NASHVILLE, TN.  
 Test: VOLATILES (8240)  
 Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
 Extraction Method: N/A  
 Matrix: SOIL  
 QC Level: II

Lab Id: 002  
 Client Sample Id: SPOIL SOIL  
 Sample Date/Time: 14-SEP-94 1312  
 Received Date: 15-SEP-94  
 Batch: NAS094  
 Blank: A Dry Weight %: 79  
 Extraction Date: N/A  
 Analysis Date: 27-SEP-94

Parameter:	Units:	Results:	Rpt Lmts:	Q:
ACETONE	UG/KG	ND	13	
ACROLEIN	UG/KG	ND	130	
ACRYLONITRILE	UG/KG	ND	130	
BENZENE	UG/KG	ND	1	
BROMODICHLOROMETHANE	UG/KG	ND	1	
BROMOFORM	UG/KG	ND	3	
BROMOMETHANE	UG/KG	ND	1	
2-BUTANONE (MEK)	UG/KG	ND	4	
CARBON DISULFIDE	UG/KG	ND	1	
CARBON TETRACHLORIDE	UG/KG	ND	3	
CHLOROBENZENE	UG/KG	ND	1	
CHLOROETHANE	UG/KG	ND	1	
2-CHLOROETHYL VINYL ETHER	UG/KG	ND	6	
CHLOROFORM	UG/KG	ND	3	
CHLOROMETHANE	UG/KG	ND	3	
CHLORODIBROMOMETHANE	UG/KG	ND	6	
DIBROMOMETHANE	UG/KG	ND	6	
DICHLORODIFLUOROMETHANE	UG/KG	ND	6	
1,1-DICHLOROETHANE	UG/KG	ND	1	
1,2-DICHLOROETHANE	UG/KG	ND	3	
1,1-DICHLOROETHENE	UG/KG	ND	1	
TOTAL 1,2-DICHLOROETHYLENE	UG/KG	ND	6	
1,2-DICHLOROPROPANE	UG/KG	ND	3	
CIS-1,3-DICHLOROPROPENE	UG/KG	ND	1	
TRANS-1,3-DICHLOROPROPENE	UG/KG	ND	1	
1,4-DICHLORO-2-BUTENE	UG/KG	ND	6	
ETHYL BENZENE	UG/KG	ND	1	
ETHYL METHACRYLATE	UG/KG	ND	6	
2-HEXANONE	UG/KG	ND	4	
IODOMETHANE	UG/KG	ND	6	
METHYLENE CHLORIDE	UG/KG	ND	4	
4-METHYL-2-PENTANONE	UG/KG	ND	4	
STYRENE	UG/KG	ND	3	
1,1,2,2-TETRACHLOROETHANE	UG/KG	ND	3	
TETRACHLOROETHENE	UG/KG	ND	1	
TOLUENE	UG/KG	ND	6	
1,1,1-TRICHLOROETHANE	UG/KG	ND	6	
1,1,2-TRICHLOROETHANE	UG/KG	ND	3	
TRICHLOROETHENE	UG/KG	ND	1	
TRICHLOROFLUOROMETHANE	UG/KG	ND	1	

## "FINAL REPORT FORMAT - SINGLE"

Accession: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Test: VOLATILES (8240)  
Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
Extraction Method: N/A  
Matrix: SOIL  
QC Level: II

Lab Id: 002 Sample Date/Time: 14-SEP-94 1312  
Client Sample Id: SPOIL SOIL Received Date: 15-SEP-94

Parameter:	Units:	Results:	Rpt Lmts:	Q:
1,2,3 TRICHLOROPROPANE	UG/KG	ND	6	
VINYL ACETATE	UG/KG	ND	3	
VINYL CHLORIDE	UG/KG	ND	1	
TOTAL XYLENES	UG/KG	ND	3	
BROMOFLUOROBENZENE	%REC/SURR	92	74-121	
1,2-DICHLOROETHANE-D4	%REC/SURR	95	70-121	
TOLUENE-D8	%REC/SURR	104	81-117	
ANALYST	INITIALS	DWB		

Comments:

2 6 1629

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

(0) Page 5  
Date 03-Oct-94

"FINAL REPORT FORMAT - SINGLE"

Accession: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Test: VOLATILES (8240)  
Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
Extraction Method: N/A  
Matrix: SOIL  
QC Level: II

Lab Id: 002  
Client Sample Id: SPOIL SOIL

Sample Date/Time: 14-SEP-94 1312  
Received Date: 15-SEP-94

"Sample Tic Report"

Number of Tics Found: 0  
Concentration Units: UG/KG

Cas Number: Compound Name:

RT: Est Conc: Q:



## PROJECT SAMPLE INSPECTION FORM

Accession #:

409578

Date received:

15<sup>th</sup> SEP-94

- |   |                                      |                          |   |  |                                      |                          |                                      |
|---|--------------------------------------|--------------------------|---|--|--------------------------------------|--------------------------|--------------------------------------|
| 1. Was there a Chain of Custody?                                      | <input checked="" type="radio"/> YES | <input type="radio"/> NO | 7. Are samples correctly preserved for analysis required? | <input checked="" type="radio"/> YES                                       | <input type="radio"/> NO             | N/A                      |                                      |
| 2. Was Chain of Custody properly relinquished?                        | <input checked="" type="radio"/> YES | <input type="radio"/> NO | 8. Is there sufficient volume for analysis requested?     | <input checked="" type="radio"/> YES                                       | <input type="radio"/> NO             |                          |                                      |
| 3. Were samples received cold? (At 4° or on ice)                      | <input checked="" type="radio"/> YES | <input type="radio"/> NO | N/A   | 9. Were samples received within holding time?                              | <input checked="" type="radio"/> YES | <input type="radio"/> NO |                                      |
| 4. Were all containers properly labeled and identified?               | <input checked="" type="radio"/> YES | <input type="radio"/> NO |   | 10. Was there headspace greater than 1/4" in diameter in volatile bottles? | <input type="radio"/> YES            | <input type="radio"/> NO | <input checked="" type="radio"/> N/A |
| 5. Were samples received in proper containers for analysis requested? | <input checked="" type="radio"/> YES | <input type="radio"/> NO |   | 11. If sent, were matrix spike bottles returned?                           | <input type="radio"/> YES            | <input type="radio"/> NO | <input checked="" type="radio"/> N/A |
| 6. Were all sample containers received intact?                        | <input checked="" type="radio"/> YES | <input type="radio"/> NO |   |  |                                      |                          |                                      |

Tracking Number: 2827145381

Shipped By:

FED EX

Cooler Number:

N/A

Out of Control Events and Inspection Comments:

Inspected By:

R. F. Oote

Date:

16-SEP-94

Logged By:

R. F. Oote

Date:

16-SEP-94

747010

## Chain-of-Custody Form

515 333 0630 800 676 5770  
Fax 515 721 0655Facility Name: CSX KANDOR YARDFacility Location: NASHVILLE, TN.Project Number: 3-4162-3000Collectors Name: DOUG TATECollection Date: Sept 14, 1994

Sample No.	Location	Time	Type	Test Required
1	WASH WATER TANK: 1 L Amber	12:58	Water	PCB 608
2	" " " 2.40 mL 1/4 L	1:01	"	VOC's 8240
3	" " " 1 L 1/4 L	1:04	"	TIC mod 8015
4	" " " 1 L	1:08	"	PCRA metals
5	SPoil - Soil 4oz	1:12	Soil	PCRA metals
6	" " 4oz	1:14	"	VOC's 8240 & TIC LIST
7	" " 8oz	1:16	"	TIC mod 8015 & PCB 8080
8				
9				

## Chain of Possession

Signature

Title

Date

Doug TateProject Engineer9/14/94Michael TateATI15-SEP-94

409518



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ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

Quality Control Report

Analysis: RCRA METALS

Accession:	409518
Client:	OGDEN ENVIRONMENTAL AND ENERGY SERVICES
Project Number:	3-4162-3000
Project Name:	CSX RADNOR YARD
Project Location:	NASHVILLE, TN.
Department:	METALS

2 8 1633

ANALYTICAL TECHNOLOGIES, INC.

11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 1  
Date 28-Sep-94

## "Metals Quality Control Report"

Parameter:	SILVER	ARSENIC	BARIUM	CADMIUM	CHROMIUM	MERCURY
Batch Id:	A6W270	R7W319	B6W270	C6W270	H6W270	M7W110
Blank Result:	<0.01	<0.005	<0.01	<0.005	<0.01	<0.0002
Anal. Method:	6010	7060	6010	6010	6010	7470
Prep. Method:	3010	3020	3010	3010	3010	7470
Analysis Date:	22-SEP-94	20-SEP-94	21-SEP-94	21-SEP-94	22-SEP-94	20-SEP-94
Prep. Date:	21-SEP-94	19-SEP-94	19-SEP-94	19-SEP-94	19-SEP-94	20-SEP-94

## Sample Duplication

Sample Dup:	409551-2	409575-1	409551-2	409551-2	409551-2	409562-1
Rept Limit:	<0.01	<0.005	<0.01	<0.005	<0.01	<0.0002
Sample Result:	<0.01	<0.005	0.06	<0.005	<0.01	0.0003
Dup Result:	<0.01	<0.005	0.06	<0.005	<0.01	<0.0002
Sample RPD:	N/C	N/C	0	N/C	N/C	0.0001G
Max RPD:	0.01	0.005	20	0.005	0.01	0.0002
Dry Weight%	N/A	N/A	N/A	N/A	N/A	N/A

## Matrix Spike

Sample Spiked:	409551-2	409575-1	409551-2	409551-2	409551-2	409562-1
Rept Limit:	<0.01	<0.005	<0.01	<0.005	<0.01	<0.0002
Sample Result:	<0.01	<0.005	0.06	<0.005	<0.01	0.0003
Spiked Result:	2.0	0.034	2.0	2.0	2.1	0.0046
Spike Added:	2.0	0.040	2.0	2.0	2.0	0.0050
% Recovery:	100	85	97	100	105	86
% Rec Limits:	75-125	75-125	75-125	75-125	75-125	75-125
Dry Weight%	N/A	N/A	N/A	N/A	N/A	N/A

## ICV

ICV Result:	4.8	0.037	4.9	4.9	5.1	0.0042
True Result:	5.0	0.040	5.0	5.0	5.0	0.0040
% Recovery:	96	93	98	98	102	105
% Rec Limits:	90-110	90-110	90-110	90-110	90-110	80-120

## LCS

LCS Result:	2.0	0.039	2.0	2.0	2.4	0.0050
True Result:	2.0	0.040	2.0	2.0	2.0	0.0050
% Recovery:	100	98	100	100	120	100
% Rec Limits:	80-120	80-120	80-120	80-120	80-120	80-120

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[0] Page 2  
Date 28-Sep-94

"Metals Quality Control Report"

Parameter:	LEAD	SELENIUM	SILVER	ARSENIC	BARIUM	CADMIUM
Batch Id:	P7W319	S7W319	A6S207	R6S207	B6S207	C6S207
Blank Result:	<0.003	<0.005	<1	<5	<1	<0.5
Anal. Method:	7421	7740	6010	6010	6010	6010
Prep. Method:	3020	3020	3050	3050	3050	3050
Analysis Date:	25-SEP-94	19-SEP-94	26-SEP-94	26-SEP-94	26-SEP-94	26-SEP-94
Prep. Date:	19-SEP-94	19-SEP-94	21-SEP-94	21-SEP-94	21-SEP-94	21-SEP-94

Sample Duplication

Sample Dup:	409575-1	409575-1	409554-1	409554-1	409554-1	409554-1
Rept Limit:	<0.003	<0.005	<1	<5	<1	<0.5
Sample Result:	<0.003	<0.005	<1	<5	4	<0.5
Dup Result:	<0.003	<0.005	<1	<5	3	<0.5
Sample RPD:	N/C	N/C	N/C	N/C	1G	N/C
Max RPD:	0.003	0.005	1	5	1	0.5
Dry Weight%	N/A	N/A	N/A	N/A	N/A	N/A

Matrix Spike

Sample Spiked:	409575-1	409575-1	409554-1	409554-1	409554-1	409554-1
Rept Limit:	<0.003	<0.005	<1	<5	<1	<0.5
Sample Result:	<0.003	<0.005	<1	<5	4	<0.5
Spiked Result:	0.020	0.008	200	190	210	200
Spike Added:	0.020	0.010	200	200	200	200
% Recovery:	100	80	100	95	103	100
% Rec Limits:	75-125	75-125	75-125	75-125	75-125	75-125
Dry Weight%	N/A	N/A	N/A	N/A	N/A	N/A

ICV

ICV Result:	0.038	0.020	4.7	4.8	5.0	5.0
True Result:	0.040	0.020	5.0	5.0	5.0	5.0
% Recovery:	95	100	94	96	100	100
% Rec Limits:	90-110	90-110	90-110	90-110	90-110	90-110

LCS

LCS Result:	0.021	0.011	85	78	64	70
True Result:	0.020	0.010	71.7	72.1	64.8	61.6
% Recovery:	105	110	119	108	99	114
% Rec Limits:	80-120	80-120	48-152	48-152	69-136	58-140

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ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 3  
Date 28-Sep-94

## "Metals Quality Control Report"

Parameter:	CHROMIUM	MERCURY	LEAD	SELENIUM
Batch Id:	H6S207	M4S092	P6S207	S6S207
Blank Result:	<1	<0.1	<5	<10
Anal. Method:	6010	7471	6010	6010
Prep. Method:	3050	7471	3050	3050
Analysis Date:	26-SEP-94	28-SEP-94	26-SEP-94	26-SEP-94
Prep. Date:	21-SEP-94	27-SEP-94	21-SEP-94	21-SEP-94

## Sample Duplication

Sample Dup:	409554-1	409518-2	409554-1	409554-1
Rept Limit:	<1	<0.1	<5	<10
Sample Result:	8	0.1	<5	<10
Dup Result:	8	0.1	<5	<10
Sample RPD:	0	N/C	N/C	N/C
Max RPD:	20	0.1	5	10
Dry Weight%	N/A	N/A	N/A	N/A

## Matrix Spike

Sample Spiked:	409554-1	409518-2	409554-1	409554-1
Rept Limit:	<1	<0.1	<5	<10
Sample Result:	8	0.1	<5	<10
Spiked Result:	230	2.6	160	210
Spike Added:	200	2.5	200	200
% Recovery:	111	100	80	105
% Rec Limits:	75-125	75-125	75-125	75-125
Dry Weight%	N/A	N/A	N/A	N/A

## ICV

ICV Result:	5.2	0.0042	5.1	5.1
True Result:	5.0	0.0040	5.0	5.0
% Recovery:	104	105	102	102
% Rec Limits:	90-110	80-120	90-110	90-110

## LCS

LCS Result:	52	38	57	86
True Result:	44.1	32	50.9	74.2
% Recovery:	118	119	112	116
% Rec Limits:	59-138	53-150	53-139	48-146

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ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 4  
Date 28-Sep-94

## "Quality Control Comments"

Batch Id: Comments:

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A6W270	ANALYST: JRR
R7W319	ANALYST: CD
B6W270	ANALYST: JRR
C6W270	ANALYST: JRR
C6W270	QC DATA IS REPORTED ON AN AS RECORDED BASIS.
C6W270	TIME ON: 14:39
H6W270	ANALYST: JRR
M7W110	ANALYST: JP
P7W319	ANALYST: CD
P7W319	Spike Source: Plasma Chem, Lot # 03J82N1P1122 for Lead.
P7W319	LCS Source: Plasma Chem, Lot # 03J82N1P1122 for Lead.
S7W319	ANALYST: SL
A6S207	ANALYST: JRR
A6S207	Spike Source: Plasma Chem, Lot # A4J470121 for Silver.
A6S207	LCS Source: Environmental Resource Association, Lot # 219 for Silver.
R6S207	ANALYST: JRR
R6S207	Spike Source: Plasma Chem, Lot # J3M33N10D for Arsenic.
R6S207	LCS Source: Environmental Resource Association, Lot # 219 for Arsenic.
B6S207	ANALYST: JRR
B6S207	Spike Source: Plasma Chem, Lot # M3M5610C for Barium.
B6S207	LCS Source: Environmental Resource Association, Lot # 219 for Barium.
C6S207	ANALYST: JRR
C6S207	Spike Source: Plasma Chem, Lot # Y3M48N10D for Cadmium.
C6S207	LCS Source: Environmental Resource Association, Lot # 219 for Cadmium.
H6S207	ANALYST: JRR
H6S207	Spike Source: Plasma Chem, Lot # Y2M24L10P8 for Chromium.
H6S207	LCS Source: Environmental Resource Association, Lot # 219 for Chromium.
M4S092	ANALYST: GJ
M4S092	Spike Source: Spex Industries, Lot # 3-88HG for Mercury.
M4S092	LCS Source: Environmental Resource Association, Lot # 219 for Mercury.
P6S207	ANALYST: JRR
P6S207	Spike Source: Plasma Chem, Lot # D3J82N10F for Lead.
P6S207	LCS Source: Environmental Resource Association, Lot # 219 for Lead.
S6S207	ANALYST: JRR
S6S207	Spike Source: Plasma Chem, Lot # Y3M34N10D for Selenium.
S6S207	LCS Source: Environmental Resource Association, Lot # 219 for Selenium.

## ----- Common Footnotes Metals -----

N/A = NOT APPLICABLE.  
 N/S = NOT SUBMITTED.  
 N/C = SAMPLE AND DUPLICATE RESULTS ARE AT OR BELOW ATI REPORTING LIMIT;  
 THEREFORE, THE RPD IS "NOT CALCULABLE" AND NO CONTROL LIMITS APPLY.  
 N/D = NOT DETECTED.  
 DISS. OR D = DISSOLVED  
 T & D = TOTAL AND DISSOLVED  
 R = REACTIVE  
 T = TOTAL  
 G = SAMPLE AND/OR DUPLICATE RESULT IS BELOW 5 X ATI REPORTING LIMIT AND  
 THE ABSOLUTE DIFFERENCE BETWEEN THE SAMPLE AND DUPLICATE RESULT IS AT  
 OR BELOW ATI REPORTING LIMIT; THEREFORE, THE RESULTS ARE "IN CONTROL".  
 Q = THE ANALYTICAL (POST-DIGESTION) SPIKE IS REPORTED DUE TO PERCENT RECOVERY  
 BEING OUTSIDE ACCEPTANCE LIMITS ON THE MATRIX (PRE-DIGESTION) SPIKE.  
 # = ELEVATED REPORTING LIMIT DUE TO INSUFFICIENT SAMPLE.  
 + = ELEVATED REPORTING LIMIT DUE TO DILUTION INTO CALIBRATION RANGE.  
 \* = ELEVATED REPORTING LIMIT DUE TO MATRIX INTERFERENCE. (DILUTION PRIOR  
 TO ANALYSIS)  
 @ = ADJUSTED REPORTING LIMIT DUE TO SAMPLE MATRIX. (DILUTION PRIOR TO  
 DIGESTION)  
 P = ANALYTICAL (POST DIGESTION) SPIKE.  
 I = DUPLICATE INJECTION.  
 & = AUTOMATED  
 F = SAMPLE SPIKED > 4 X SPIKE CONCENTRATION.  
 N/C+ = NOT CALCULABLE  
 /C\* = NOT CALCULABLE; SAMPLE SPIKED > 4 X SPIKE CONCENTRATION.  
 Δ = SAMPLE AND/OR DUPLICATE RESULT IS BELOW 5 X ATI REPORTING LIMIT AND THE  
 ABSOLUTE DIFFERENCE BETWEEN THE RESULTS EXCEEDS THE ATI REPORTING  
 LIMIT; THEREFORE, THE RESULTS ARE "OUT OF CONTROL".  
 A = SAMPLE AND DUPLICATE RESULTS ARE "OUT OF CONTROL".  
 Z = THE SAMPLE RESULT FOR THE SPIKE IS BELOW THE REPORTING LIMIT. HOWEVER,  
 THIS RESULT IS REPORTED FOR ACCURATE QC CALCULATIONS.  
 NH= SAMPLE AND / OR DUPLICATE RESULT IS BELOW 5 X ATI REPORTING LIMIT  
 AND THE ABSOLUTE DIFFERENCE BETWEEN THE RESULTS EXCEEDS THE ATI  
 REPORTING LIMIT; THEREFORE, THE RESULTS ARE "OUT OF CONTROL".  
 SAMPLE IS NON-HOMOGENEOUS.

## FROM ANALYSIS REPORT:

RL= REPORTING LIMIT BASED ON METHOD DETECTION LIMIT STUDIES.  
 Q= QUALIFIER (FOOTNOTE)

## FROM QUALITY CONTROL REPORT:

RPD= RELATIVE PERCENT DEVIATION.  
 RPT LIMIT= REPORTING LIMIT BASED ON METHOD DETECTION LIMIT STUDIES.

NOTE: THE UNITS REPORTED ON THE QUALITY CONTROL REPORT ARE EQUAL TO THOSE  
 ON THE ANALYSIS REPORT.

SW-846, 3rd Edition, September 1986 and Revision 1, July 1992.  
 EPA 600/4-79-020, Revised March 1983.  
 NIOSH Manual of Analytical Methods, 3rd Edition.

JP = JAY PEREZ  
 GJ = GARY JACOBS  
 JLH = JAMES L. HERED  
 CD = CHRISTY DRAPER

JRR = JOHN R. ROWE  
 JR = JOHN REED  
 SL = STEPHANIE LOWRY

2 6 1633

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

Quality Control Report

Analysis: TCO / PETRO. HYDROCARBON RANGE C6-C32

Accession:	409518
Client:	OGDEN ENVIRONMENTAL AND ENERGY SERVICES
Project Number:	3-4162-3000
Project Name:	CSX RADNOR YARD
Project Location:	NASHVILLE, TN.
Department:	SEMI-VOLATILE FUELS

2 6 1639

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 1  
Date 06-Oct-94

"QC Report"

Title: Water Blank  
Batch: FPW205  
Analysis Method: TCO / 8015 - SW 846, EPA UST Work Group Nov. 1990, Mod. 8015  
Extraction Method: 3510/SW-846, 3rd Edition, September 1986 and Revision 1, July 1992

---

Blank Id: A Date Analyzed: 03-OCT-94 Date Extracted: 19-SEP-94

Parameters:	Units:	Results:	Reporting Limits:
TOTAL PETROLEUM HYDROCARBON	UG/L	ND	100
ORTHO TER PHENYL	%REC/SURR	104	81-141
ANALYST	INITIALS	SJF	

Comments:



2 6 1649

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 2  
Date 06-Oct-94

"QC Report"

Title: Soil Blank  
Batch: FPS204  
Analysis Method: TCO / 8015 - SW 846, EPA UST Work Group Nov. 1990, Mod. 8015  
Extraction Method: 3550/SW-846, 3rd Edition, September 1986 and Revision 1, July 1992

---

Blank Id: B Date Analyzed: 21-SEP-94 Date Extracted: 19-SEP-94

Parameters:	Units:	Results:	Reporting Limits:
TOTAL PETROLEUM HYDROCARBON	MG/KG	ND	2.5
ORTHO TER PHENYL	%REC/SURR	69	65-135
ANALYST	INITIALS	SW	

Comments:

2 8 1641

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 3  
Date 06-Oct-94

## "QC Report"

Title: Water Reagent  
 Batch: FPW205  
 Analysis Method: TCO / 8015 - SW 846, EPA UST Work Group Nov. 1990, Mod. 8015  
 Extraction Method: 3510/SW-846, 3rd Edition, September 1986 and Revision 1, July 1992

RS Date Analyzed: 03-OCT-94  
 RSD Date Analyzed: 03-OCT-94

RS Date Extracted: 19-SEP-94  
 RSD Date Extracted: 19-SEP-94

Parameters:	Spike Added	Sample Conc	RS Conc	RS %Rec	RSD Conc	RSD %Rec	RPD	RPD Lmts	Rec Lmts
YTAL PETROLEUM HYDROCARBON	1260	<100	1059	84	1103	88	5	30	55-125

Surrogates:  
 1,2,4-TRIMETHYLBENZENE

96 99 81-141

Comments:  
 NOT ENOUGH SAMPLE SUBMITTED TO EXTRACT  
 MATRIX SPIKE/MATRIX SPIKE DUPLICATE.

Notes:  
 N/S = NOT SUBMITTED N/A = NOT APPLICABLE D = DILUTED OUT  
 UG/L = PARTS PER BILLION. < = LESS THAN REPORTING LIMIT.  
 \* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS.  
 SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE  
 PROGRAM AND REFERENCED METHOD.

2 6 1642

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

(0) Page 4  
Date 06-Oct-94

## "QC Report"

Title: Soil Reagent  
 Tech: FPS204  
 Analysis Method: TCO / 8015 - SW 846, EPA UST Work Group Nov. 1990, Mod. 8015  
 Extraction Method: 3550/SW-846, 3rd Edition, September 1986 and Revision 1, July 1992

RS Date Analyzed: 20-SEP-94  
 RSD Date Analyzed: 20-SEP-94

RS Date Extracted: 17-SEP-94  
 RSD Date Extracted: 17-SEP-94

Parameters:	Spike Added	Sample Conc	RS Conc	RS %Rec	RSD Conc	RSD %Rec	RPD	RPD Lmts	Rec Lmts
TOTAL PETROLEUM HYDROCARBON	42	<2.5	37	88	40	95	8	42	57-123
Surrogates:									
THO TER PHENYL				85		92			65-135

Comments:

## Notes:

N/S = NOT SUBMITTED N/A = NOT APPLICABLE D = DILUTED OUT  
 MG/KG = PARTS PER MILLION. < = LESS THAN REPORTING LIMIT.  
 \* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS.  
 SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE  
 PROGRAM AND REFERENCED METHOD.

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 5  
Date 06-Oct-94

Common notation for Organic reporting

N/S = NOT SUBMITTED  
N/A = NOT APPLICABLE  
= DILUTED OUT  
μ = MICROGRAMS  
UG/L = PARTS PER BILLION.  
UG/KG = PARTS PER BILLION.  
MG/M3 = MILLIGRAM PER CUBIC METER.  
PPMV = PART PER MILLION BY VOLUME.  
MG/KG = PARTS PER MILLION.  
MG/L = PARTS PER MILLION.  
✓ = LESS THAN DETECTION LIMIT.  
= VALUES OUTSIDE OF QUALITY CONTROL LIMITS

SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE PROGRAM AND REFERENCED METHOD.

ORGANIC SOILS ARE REPORTED ON A DRYWEIGHT BASIS.

ND = NOT DETECTED ABOVE REPORTING LIMIT.

PT LIMIT = REPORTING LIMITS BASED ON METHOD DETECTION LIMIT STUDIES.

RPD = RELATIVE PERCENT DIFFERENCE (OR DEVIATION)

TI/GC/FID

ATI GAS CHROMATOGRAPHIC METHOD EMPLOYING DIRECT INJECTION ON COLUMN WITH FLAME IONIZATION DETECTOR (FID).

ATI/GC/FIX

ATI GAS CHROMATOGRAPHIC METHOD FOR ANALYSIS OF FIXED GASES EMPLOYING DIRECT INJECTION ON COLUMN WITH THERMAL CONDUCTIVITY DETECTOR (TCD) AND FLAME IONIZATION DETECTOR (FID).

TI/GC/FPD

ATI GAS CHROMATOGRAPHIC METHOD EMPLOYING DIRECT INJECTION ON COLUMN WITH FLAME PHOTOMETRIC DETECTOR (FPD) IN SULFUR-SPECIFIC MODE.

ATI/GC/PID

ATI GAS CHROMATOGRAPHIC METHOD EMPLOYING DIRECT INJECTION ON COLUMN WITH PHOTOIONIZATION DETECTOR (PID).

ATI/GC/TCD

ATI GAS CHROMATOGRAPHIC METHOD EMPLOYING DIRECT INJECTION ON COLUMN WITH THERMAL CONDUCTIVITY DETECTOR (TCD).

LJT = LISA THOMASON  
SKR = SVETLANA RODKINA  
GH = DARREL HALSELL  
W = KAREN WADSWORTH  
MV = MONIQUE VERHEYDEN  
RP = ROBERT PEREZ  
LK = KERRY KUST  
W = STEVE WILHITE  
JMP = JACKIE PRICE  
SJF = STEVE FILOROMO

2 8 1644

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

Quality Control Report

Analysis: PESTICIDES (8080)

Accession: 409518  
Client: OGDEN ENVIRONMENTAL AND ENERGY SERVICES  
Project Number: 3-4162-3000  
Project Name: CSX RADNOR YARD  
Project Location: NASHVILLE, TN.  
Department: PESTICIDES

2.8 1645

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 1  
Date 04-Oct-94

## "QC Report"

Title: Soil Blank  
Batch: PSS212  
Analysis Method: 8080 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992.  
Extraction Method: 3550 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992.

Blank Id: B Date Analyzed: 28-SEP-94 Date Extracted: 24-SEP-94

Parameters:	Units:	Results:	Reporting Limits:
ALDRIN	UG/KG	ND	1.7
ALPHA-BHC	UG/KG	ND	1.7
BETA-BHC	UG/KG	ND	1.7
DELTA-BHC	UG/KG	ND	1.7
GAMMA-BHC (LINDANE)	UG/KG	ND	1.7
CHLORDANE	UG/KG	ND	17
4,4'-DDD	UG/KG	ND	3.3
4,4'-DDE	UG/KG	ND	3.3
4,4'-DDT	UG/KG	ND	3.3
DIELDRIN	UG/KG	ND	3.3
ENDOSULFAN I	UG/KG	ND	1.7
ENDOSULFAN II	UG/KG	ND	3.3
ENDOSULFAN SULFATE	UG/KG	ND	3.3
ENDRIN	UG/KG	ND	3.3
ENDRIN ALDEHYDE	UG/KG	ND	3.3
HEPTACHLOR	UG/KG	ND	1.7
HEPTACHLOR EPOXIDE	UG/KG	ND	1.7
PCB-1016	UG/KG	ND	33
PCB-1221	UG/KG	ND	33
PCB-1232	UG/KG	ND	33
PCB-1242	UG/KG	ND	33
PCB-1248	UG/KG	ND	33
PCB-1254	UG/KG	ND	33
PCB-1260	UG/KG	ND	33
TOXAPHENE	UG/KG	ND	100
METHOXYCHLOR	UG/KG	ND	17
DCB	%REC/SURR	107	20-150
TCMX	%REC/SURR	90	20-140
ANALYST	INITIALS	RP	

Comments:

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

(0) Page 2  
Date 04-Oct-94

## "QC Report"

Title: Soil Reagent  
 Patch: PSS212  
 Analysis Method: 8080 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992.  
 Extraction Method: 3550 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992.

RS Date Analyzed: 30-SEP-94  
 RSD Date Analyzed: 30-SEP-94

RS Date Extracted: 23-SEP-94  
 RSD Date Extracted: 23-SEP-94

Parameters:	Spike Added	Sample Conc	RS Conc	RS %Rec	RSD Conc	RSD %Rec	RPD	Rec Lmts	Rec Lmts
INDANE	6.7	<1.7	6.7	100	6.2	93	7	37	32-127
DEPTACHLOR	6.7	<1.7	6.7	100	6.7	100	0	46	34-111
ALDRIN	6.7	<1.7	6.0	90	5.8	87	3	46	42-122
DELDRIN	16.7	<3.3	17.2	103	17.0	102	1	41	36-146
ENDRIN	16.7	<3.3	17.4	104	17.3	104	0	40	30-147
DT	16.7	<3.3	17.7	106	17.5	105	1	34	25-160

Surrogates:	RS	RSD	Rec Lmts
CB	103	102	20-150
MX	98	95	20-140

Comments:

## Notes:

N/S = NOT SUBMITTED N/A = NOT APPLICABLE D = DILUTED OUT  
 G/KG = PARTS PER BILLION. < = LESS THAN REPORTING LIMIT.  
 \* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS.  
 SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE PROGRAM AND REFERENCED METHOD.

2 8 1647

[0] Page 3

Date 04-Oct-94

## "QC Report"

Title: Soil Matrix  
 Batch: PSS212  
 Analysis Method: 8080 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992.  
 Extraction Method: 3550 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992.

Dry Weight %: 99  
 Sample Spiked: 409497-47

MS Date Analyzed: 30-SEP-94  
 MSD Date Analyzed: 30-SEP-94

MS Date Extracted: 23-SEP-94  
 MSD Date Extracted: 23-SEP-94

Parameters:	Spike Added	Sample Conc	MS Conc	MS %Rec	MSD Conc	MSD %Rec	RPD	RPD Lmts	Rec Lmts
ENDANE	6.8	<1.7	4.7	69	4.6	68	1	37	32-127
HEPTACHLOR	6.8	<1.7	6.1	90	7.1	104	14	46	34-111
ALDRIN	6.8	<1.7	6.7	99	7.6	112	12	46	42-122
D DLDIN	16.9	<3.33	14.6	86	17.0	101	16	41	36-146
E DRIN	16.9	<3.33	19.1	113	18.3	108	5	40	30-147
DLF	16.9	<3.33	16.8	99	19.3	114	14	34	25-160

## Surrogates:

D 3			114		130		20-150
T 4X			86		103		20-140

## Comments:

## Notes:

N/S = NOT SUBMITTED N/A = NOT APPLICABLE D = DILUTED OUT  
 UG/KG = PARTS PER BILLION. < = LESS THAN REPORTING LIMIT.  
 \* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS.  
 SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE  
 PROGRAM AND REFERENCED METHOD.



## Common notation for Organic reporting

N/S = NOT SUBMITTED  
N/A = NOT APPLICABLE  
D = DILUTED OUT  
UG/L = PARTS PER BILLION.  
UG/KG = PARTS PER BILLION.  
MG/KG = PARTS PER MILLION.  
MG/L = PARTS PER MILLION.  
< = LESS THAN DETECTION LIMIT.  
\* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS.  
J = THE REPORTED VALUE IS EITHER LESS THAN THE REPORTING LIMIT BUT  
GREATER THAN ZERO, OR QUANTITATED AS A TIC; THEREFORE, IT IS  
ESTIMATED.  
JJ = THE REPORTED VALUE IS ESTIMATED DUE TO MATRIX INTERFERENCE.  
ND = NOT DETECTED ABOVE REPORTING LIMIT.  
RPT LIMIT = REPORTING LIMITS BASED ON METHOD DETECTION LIMIT STUDIES.  
RPD = RELATIVE PERCENT DIFFERENCE (OR DEVIATION)

SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE PROGRAM  
AND REFERENCED METHOD.

ORGANIC SOILS ARE REPORTED ON A DRY WEIGHT BASIS.

RP = ROBERT PEREZ  
KK = KERRY KUST  
RW = ROBERT WOLFE  
FC = FRANKIE COLEMAN

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

Quality Control Report

Analysis: PESTICIDES (608)

Accession:	409518
Client:	OGDEN ENVIRONMENTAL AND ENERGY SERVICES
Project Number:	3-4162-3000
Project Name:	CSX RADNOR YARD
Project Location:	NASHVILLE, TN.
Department:	PESTICIDES

2 8 1650

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 1  
Date 26-Sep-94

"QC Report"

Title: Water Blank  
Batch: PSW207  
Analysis Method: 608 / Federal Register 40 CFR, Part 136, July 1, 1992  
Extraction Method: 608 / Federal Register 40 CFR, Part 136, July 1, 1992

---

Blank Id: B Date Analyzed: 22-SEP-94 Date Extracted: 20-SEP-94

Parameters:	Units:	Results:	Reporting Limits:
ALDRIN	UG/L	ND	0.05
ALPHA-BHC	UG/L	ND	0.05
BETA-BHC	UG/L	ND	0.05
DELTA-BHC	UG/L	ND	0.05
GAMMA-BHC (LINDANE)	UG/L	ND	0.05
CHLORDANE	UG/L	ND	0.5
4,4'-DDD	UG/L	ND	0.10
4,4'-DDE	UG/L	ND	0.10
4,4'-DDT	UG/L	ND	0.10
DIELDRIN	UG/L	ND	0.10
ENDOSULFAN I	UG/L	ND	0.05
ENDOSULFAN II	UG/L	ND	0.10
ENDOSULFAN SULFATE	UG/L	ND	0.10
ENDRIN	UG/L	ND	0.10
ENDRIN ALDEHYDE	UG/L	ND	0.10
HEPTACHLOR	UG/L	ND	0.05
HEPTACHLOR EPOXIDE	UG/L	ND	0.05
PCB-1016	UG/L	ND	1.0
PCB-1221	UG/L	ND	1.0
PCB-1232	UG/L	ND	1.0
PCB-1242	UG/L	ND	1.0
PCB-1248	UG/L	ND	1.0
PCB-1254	UG/L	ND	1.0
PCB-1260	UG/L	ND	1.0
TOXAPHENE	UG/L	ND	3.0
METHOXYCHLOR	UG/L	ND	0.5
DCB	%REC/SURR	111	20-150
TCMX	%REC/SURR	97	20-140
ANALYST	INITIALS	RP	

Comments:

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 2  
Date 26-Sep-94

## "QC Report"

Title: Water Reagent  
 Tech: PSW207  
 Analysis Method: 608 / Federal Register 40 CFR, Part 136, July 1, 1992  
 Extraction Method: 608 / Federal Register 40 CFR, Part 136, July 1, 1992

RS Date Analyzed: 21-SEP-94  
 RSD Date Analyzed: 21-SEP-94

RS Date Extracted: 19-SEP-94  
 RSD Date Extracted: 19-SEP-94

Parameters:	Spike Added	Sample Conc	RS Conc	RS %Rec	RSD Conc	RSD %Rec	RPD	RPD Lmts	Rec Lmts
NDANE	0.20	<0.05	0.16	80	0.18	90	12	37	32-127
HEPTACHLOR	0.20	<0.05	0.17	85	0.19	95	11	46	34-111
LDRLIN	0.20	<0.05	0.17	85	0.20	100	16	46	42-122
ELDRIN	0.50	<0.10	0.45	90	0.50	100	11	41	36-146
DRIN	0.50	<0.10	0.47	94	0.52	104	10	40	30-147
DT	0.50	<0.10	0.47	94	0.52	104	10	34	25-160

Surrogates:	RS	RSD	RPD	Rec Lmts
DB	93	106		20-150
MX	86	96		20-140

Comments:

Notes:

N/S = NOT SUBMITTED N/A = NOT APPLICABLE D = DILUTED OUT

G/L = PARTS PER BILLION. &lt; = LESS THAN REPORTING LIMIT.

\* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS.

SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE PROGRAM AND REFERENCED METHOD.

2 6 1652

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 3  
Date 26-Sep-94

## "QC Report"

Title: Water Matrix  
 Batch: PSW207  
 Analysis Method: 608 / Federal Register 40 CFR, Part 136, July 1, 1992  
 Extraction Method: 608 / Federal Register 40 CFR, Part 136, July 1, 1992

Sample Weight %: N/A MS Date Analyzed: 21-SEP-94 MS Date Extracted: 19-SEP-94  
 Sample Spiked: 409497-63 MSD Date Analyzed: 21-SEP-94 MSD Date Extracted: 19-SEP-94

Parameters:	Spike Added	Sample Conc	MS Conc	MS %Rec	MSD Conc	MSD %Rec	RPD	RPD Lmts	Rec Lmts
INDANE	0.20	<0.05	0.16	80	0.16	80	0	37	30-130
HEPTACHLOR	0.20	<0.05	0.17	85	0.17	85	0	46	30-115
ALDRIN	0.20	<0.05	0.16	80	0.16	80	0	46	40-125
DELDRIN	0.50	<0.10	0.46	92	0.47	94	2	41	30-150
DDT	0.50	<0.10	0.49	98	0.49	98	0	40	30-150
DDT	0.50	<0.10	0.51	102	0.52	104	2	34	20-160

Surrogates:

DB	83	90	20-150
MX	86	74	20-140

Comments:

Notes:  
 N/S = NOT SUBMITTED N/A = NOT APPLICABLE D = DILUTED OUT  
 UG/L = PARTS PER BILLION. < = LESS THAN REPORTING LIMIT.  
 \* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS.  
 SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE PROGRAM AND REFERENCED METHOD.

## Common notation for Organic reporting

N/S = NOT SUBMITTED  
N/A = NOT APPLICABLE  
D = DILUTED OUT  
UG/L = PARTS PER BILLION.  
UG/KG = PARTS PER BILLION.  
MG/KG = PARTS PER MILLION.  
MG/L = PARTS PER MILLION.  
< = LESS THAN DETECTION LIMIT.  
\* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS.  
J = THE REPORTED VALUE IS EITHER LESS THAN THE REPORTING LIMIT BUT  
GREATER THAN ZERO, OR QUANTITATED AS A TIC; THEREFORE, IT IS  
ESTIMATED.  
JJ = THE REPORTED VALUE IS ESTIMATED DUE TO MATRIX INTERFERENCE.  
ND = NOT DETECTED ABOVE REPORTING LIMIT.  
RPT LIMIT = REPORTING LIMITS BASED ON METHOD DETECTION LIMIT STUDIES.  
RPD = RELATIVE PERCENT DIFFERENCE (OR DEVIATION)

SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE PROGRAM  
AND REFERENCED METHOD.

ORGANIC SOILS ARE REPORTED ON A DRY WEIGHT BASIS.

RP = ROBERT PEREZ  
KK = KERRY KUST  
RW = ROBERT WOLFE  
FC = FRANKIE COLEMAN

2 8 1654

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

Quality Control Report

Analysis: VOLATILES (8240)

Accession:	409518
Client:	OGDEN ENVIRONMENTAL AND ENERGY SERVICES
Project Number:	3-4162-3000
Project Name:	CSX RADNOR YARD
Project Location:	NASHVILLE, TN.
Department:	ORGANIC/MS

2 8 1655

JA CAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

{0} Page 1  
Date 03-Oct-94

## "QC Report"

Title: Water Blank  
Batch: BUW009  
Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
Extraction Method: N/A

Blank Id: B	Date Analyzed: 23-SEP-94	Date Extracted: N/A	Units:	Results:	Reporting Limits:
Parameters:					
ACETONE			UG/L	ND	10
ACROLEIN			UG/L	ND	100
ACRYLONITRILE			UG/L	ND	100
BENZENE			UG/L	ND	1
BROMODICHLOROMETHANE			UG/L	ND	1
BROMOFORM			UG/L	ND	2
BROMOMETHANE			UG/L	ND	1
2-BUTANONE (MEK)			UG/L	ND	3
CARBON DISULFIDE			UG/L	ND	1
CARBON TETRACHLORIDE			UG/L	ND	2
CHLOROETHANE			UG/L	ND	1
2-CHLOROETHYL VINYL ETHER			UG/L	ND	5
CHLOROFORM			UG/L	ND	5
CHLOROMETHANE			UG/L	ND	5
CHLORODIBROMOMETHANE			UG/L	ND	1
DIBROMOMETHANE			UG/L	ND	2
DICHLORODIFLUOROMETHANE			UG/L	ND	1
1,1-DICHLOROETHANE			UG/L	ND	5
1,2-DICHLOROETHANE			UG/L	ND	2
1,1-DICHLOROETHENE			UG/L	ND	1
TOTAL 1,2-DICHLOROETHYLENE			UG/L	ND	1
1,2-DICHLOROPROPANE			UG/L	ND	5
CIS-1,3-DICHLOROPROPENE			UG/L	ND	1
TRANS-1,3-DICHLOROPROPENE			UG/L	ND	5
1,4-DICHLORO-2-BUTENE			UG/L	ND	3
ETHYL BENZENE			UG/L	ND	5
ETHYL METHACRYLATE			UG/L	ND	3
2-HEXANONE			UG/L	ND	3
IODOMETHANE			UG/L	ND	2
METHYLENE CHLORIDE			UG/L	ND	2
4-METHYL-2-PENTANONE			UG/L	ND	1
STYRENE			UG/L	ND	5
1,1,2,2-TETRACHLOROETHANE			UG/L	ND	5
TETRACHLOROETHENE			UG/L	ND	2
TOLUENE			UG/L	ND	1
1,1,1-TRICHLOROETHANE			UG/L	ND	1
1,1,2-TRICHLOROETHANE			UG/L	ND	5
TRICHLOROETHENE			UG/L	ND	2
TRICHLOROFLUOROMETHANE			UG/L	ND	1
1,2,3-TRICHLOROPROPANE			UG/L	ND	2
VINYL ACETATE			UG/L	ND	82-115
VINYL CHLORIDE			UG/L	ND	76-114
TOTAL XYLENES			%REC/SURR	100	
BROMOFLUOROBENZENE			%REC/SURR	95	
1,2-DICHLOROETHANE-D4					



2 8 1656

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 2  
Date 03-Oct-94

"QC Report"

Title: Water Blank  
Batch: BUW009  
Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
Extraction Method: N/A

---

Parameters:	Units:	Results:	Reporting Limits:
TOLUENE-D8	%REC/SURR	101	88-115
ANALYST	INITIALS	LD	

Comments:

2 0 1657

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

(0) Page 3  
Date 03-Oct-94

## "QC Report"

Title: Low Soil Blank  
 Batch: NAS094  
 Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
 Extraction Method: N/A

Blank Id: A Date Analyzed: 27-SEP-94 Date Extracted: N/A

Parameters:	Units:	Results:	Reporting Limits:
ACETONE	UG/KG	ND	10
ACROLEIN	UG/KG	ND	100
ACRYLONITRILE	UG/KG	ND	100
BENZENE	UG/KG	ND	1
BROMODICHLOROMETHANE	UG/KG	ND	1
BROMOFORM	UG/KG	ND	2
BROMOMETHANE	UG/KG	ND	1
2-BUTANONE (MEK)	UG/KG	ND	3
CARBON DISULFIDE	UG/KG	ND	1
CARBON TETRACHLORIDE	UG/KG	ND	2
CHLOROETHANE	UG/KG	ND	1
CHLOROBENZENE	UG/KG	ND	1
2-CHLOROETHYL VINYL ETHER	UG/KG	ND	5
CHLOROFORM	UG/KG	ND	2
CHLOROMETHANE	UG/KG	ND	2
CHLORODIBROMOMETHANE	UG/KG	ND	5
DIBROMOMETHANE	UG/KG	ND	5
DICHLORODIFLUOROMETHANE	UG/KG	ND	5
1,1-DICHLOROETHANE	UG/KG	ND	1
1,2-DICHLOROETHANE	UG/KG	ND	2
1,1-DICHLOROETHENE	UG/KG	ND	1
TOTAL 1,2-DICHLOROETHYLENE	UG/KG	ND	5
1,2-DICHLOROPROPANE	UG/KG	ND	2
CIS-1,3-DICHLOROPROPENE	UG/KG	ND	1
TRANS-1,3-DICHLOROPROPENE	UG/KG	ND	1
1,4-DICHLORO-2-BUTENE	UG/KG	ND	5
ETHYL BENZENE	UG/KG	ND	1
ETHYL METHACRYLATE	UG/KG	ND	5
2-HEXANONE	UG/KG	ND	3
IODOMETHANE	UG/KG	ND	5
METHYLENE CHLORIDE	UG/KG	ND	3
4-METHYL-2-PENTANONE	UG/KG	ND	3
STYRENE	UG/KG	ND	2
1,1,2,2-TETRACHLOROETHANE	UG/KG	ND	2
TETRACHLOROETHENE	UG/KG	ND	1
TOLUENE	UG/KG	ND	5
1,1,1-TRICHLOROETHANE	UG/KG	ND	5
1,1,2-TRICHLOROETHANE	UG/KG	ND	2
TRICHLOROETHENE	UG/KG	ND	1
TRICHLOROFLUOROMETHANE	UG/KG	ND	1
1,2,3 TRICHLOROPROPANE	UG/KG	ND	5
VINYL ACETATE	UG/KG	ND	2
VINYL CHLORIDE	UG/KG	ND	1
TOTAL XYLENES	UG/KG	ND	2
BROMOFLUOROBENZENE	%REC/SURR	96	74-121
1,2-DICHLOROETHANE-D4	%REC/SURR	94	70-121

218 1658

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

(0) Page 4  
Date 03-Oct-94

"QC Report"

Title: Low Soil Blank  
Batch: NAS094  
Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
Extraction Method: N/A

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Parameters:	Units:	Results:	Reporting Limits:
TOLUENE-D8	%REC/SURR	105	81-117
ANALYST	INITIALS	DWB	

Comments:

2 8 1659

[0] Page 5  
Date 03-Oct-94

"QC Report"

Title: Water Reagent  
Batch: BUW009  
Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
Extraction Method: N/A

RS Date Analyzed: 23-SEP-94  
RSD Date Analyzed: 23-SEP-94

RS Date Extracted: N/A  
RSD Date Extracted: N/A

Parameters:	Spike Added	Sample Conc	RS Conc	RS %Rec	RSD Conc	RSD %Rec	RPD	RPD Lmts	Rec Lmts
1,1-DICHLOROETHENE	50	<1	50	100	48	96	4	14	88-120
1,2-DICHLOROETHENE	50	<1	49	98	50	100	2	14	88-108
BENZENE	50	<1	52	104	54	108	4	11	83-112
TOLUENE	50	<5	51	102	52	104	2	13	47-150
CHLOROBENZENE	50	<1	50	100	51	102	2	13	81-118
Surrogates:									
1,2-DICHLOROETHANE-D4				95		96			76-114
TOLUENE-D8				101		101			88-115
BROMOFLUOROBENZENE				102		102			82-115

Comments:

Notes:  
N/S = NOT SUBMITTED N/A = NOT APPLICABLE D = DILUTED OUT  
UG/L = PARTS PER BILLION. < = LESS THAN REPORTING LIMIT.  
\* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS.  
SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE PROGRAM AND REFERENCED METHOD.

2 6 1600

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

[0] Page 6  
Date 03-Oct-94

## "QC Report"

Title: Low Soil Reagent  
 Batch: NAS094  
 Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
 Extraction Method: N/A

RS Date Analyzed: 27-SEP-94  
 RSD Date Analyzed: 27-SEP-94

RS Date Extracted: N/A  
 RSD Date Extracted: N/A

Parameters:	Spike Added	Sample Conc	RS Conc	RS %Rec	RSD Conc	RSD %Rec	RPD	Rec Lmts
1,1-DICHLOROETHENE	50	<1	46	92	46	92	0	82-128
1,2-DICHLOROETHENE	50	<1	50	100	49	98	2	71-157
BENZENE	50	<1	52	104	51	102	2	74-128
TOLUENE	50	<5	53	106	54	108	2	67-151
1,4-DICHLOROBENZENE	50	<1	57	114	57	114	0	78-127

Surrogates:	RS %Rec	RSD %Rec	Rec Lmts
1,2-DICHLOROETHANE-D4	96	97	70-121
TOLUENE-D8	99	101	81-117
1,4-DIBROMOBENZENE	100	96	74-121

Comments:

Notes:  
 N/S = NOT SUBMITTED N/A = NOT APPLICABLE D = DILUTED OUT  
 UG/KG = PARTS PER BILLION. < = LESS THAN REPORTING LIMIT.  
 \* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS.  
 SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE  
 PROGRAM AND REFERENCED METHOD.

28 1661

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

(0) Page 7  
Date 03-Oct-94

## "QC Report"

Title: Water Matrix  
 Batch: BUW009  
 Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
 Extraction Method: N/A

Sample Weight %: N/A  
 Sample Spiked: 409488-21

MS Date Analyzed: 24-SEP-94  
 MSD Date Analyzed: 24-SEP-94

MS Date Extracted: N/A  
 MSD Date Extracted: N/A

Parameters:	Spike Added	Sample Conc	MS Conc	MS %Rec	MSD Conc	MSD %Rec	RPD	RPD Lmts	Rec Lmts
1-DICHLOROETHENE	50	<1	47	94	49	98	4	14	88-120
TRICHLOROETHENE	50	<1	47	94	50	100	6	14	88-108
BENZENE	50	<1	51	102	55	110	8	11	83-112
TOLUENE	50	<5	50	100	53	106	6	13	47-150
CHLOROBENZENE	50	<1	50	100	52	104	4	13	81-118

Surrogates:	MS	MSD	Rec Lmts
1,2-DICHLOROETHANE-D4	99	96	76-114
TOLUENE-D8	100	98	88-115
BROMOFLUOROBENZENE	97	100	82-115

Comments:

## Notes:

N/S = NOT SUBMITTED N/A = NOT APPLICABLE D = DILUTED OUT  
 UG/L = PARTS PER BILLION. < = LESS THAN REPORTING LIMIT.  
 \* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS.  
 SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE  
 PROGRAM AND REFERENCED METHOD.

2 6 1662

ANALYTICAL TECHNOLOGIES, INC. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

(0) Page 8  
Date 03-Oct-94

## "QC Report"

Title: Low Soil Matrix  
 Tech: NAS094  
 Analysis Method: 8240 / SW-846, 3rd Edition, September 1986 and Rev. 1, July 1992  
 Extraction Method: N/A

Sample Weight %: 82  
 Sample Spiked: 409688-5

MS Date Analyzed: 27-SEP-94 MS Date Extracted: N/A  
 MSD Date Analyzed: 27-SEP-94 MSD Date Extracted: N/A

Parameters:	Spike Added	Sample Conc	MS Conc	MS %Rec	MSD Conc	MSD %Rec	MSD RPD	RPD Lmts	Rec Lmts
1-DICHLOROETHENE	61	<1.2	65	107	60	98	9	22	82-128
TRICHLOROETHENE	61	<1.2	61	100	59	97	3	24	71-157
BENZENE	61	<1.2	65	107	62	102	5	21	74-128
LUENE	61	<6.1	68	111	65	107	4	21	67-151
LOROBENZENE	61	<1.2	67	110	63	103	7	21	78-127

Surrogates:

2-DICHLOROETHANE-D4	98	99	70-121
LUENE-D8	99	98	81-117
OMOFLUOROBENZENE	96	96	74-121

Comments:

## Notes:

N/S = NOT SUBMITTED N/A = NOT APPLICABLE D = DILUTED OUT  
 G/KG = PARTS PER BILLION. < = LESS THAN REPORTING LIMIT.  
 \* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS.  
 SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE PROGRAM AND REFERENCED METHOD.

## Common notation for Organic reporting

N/S = NOT SUBMITTED  
N/A = NOT APPLICABLE  
D = DILUTED OUT  
UG/L = PARTS PER BILLION.  
UG/KG = PARTS PER BILLION.  
MG/KG = PARTS PER MILLION.  
MG/L = PARTS PER MILLION.  
MG/M3 = MILLIGRAMS PER CUBIC METER.  
NG = NANOGRAMS.  
UG = MICROGRAMS.  
PPBV = PARTS PER BILLION/VOLUME.  
< = LESS THAN DETECTION LIMIT.  
\* = VALUES OUTSIDE OF QUALITY CONTROL LIMITS  
J = THE REPORTED VALUE IS EITHER LESS THAN THE REPORTING LIMIT BUT  
GREATER THAN ZERO, OR QUANTITATED AS A TIC; THEREFORE, IT IS  
ESTIMATED.  
JJ = REPORTED VALUE IS ESTIMATED DUE TO MATRIX INTERFERENCE.  
ND = NOT DETECTED ABOVE REPORT LIMIT.  
RPT LIMIT = REPORTING LIMITS BASED ON METHOD DETECTION LIMIT STUDIES.  
RPD = RELATIVE PERCENT DIFFERENCE (OR DEVIATION)

SOURCES FOR CONTROL LIMITS ARE INTERNAL LABORATORY QUALITY ASSURANCE  
PROGRAM AND REFERENCED METHOD.

ORGANIC SOILS ARE REPORTED ON A DRY WEIGHT BASIS.

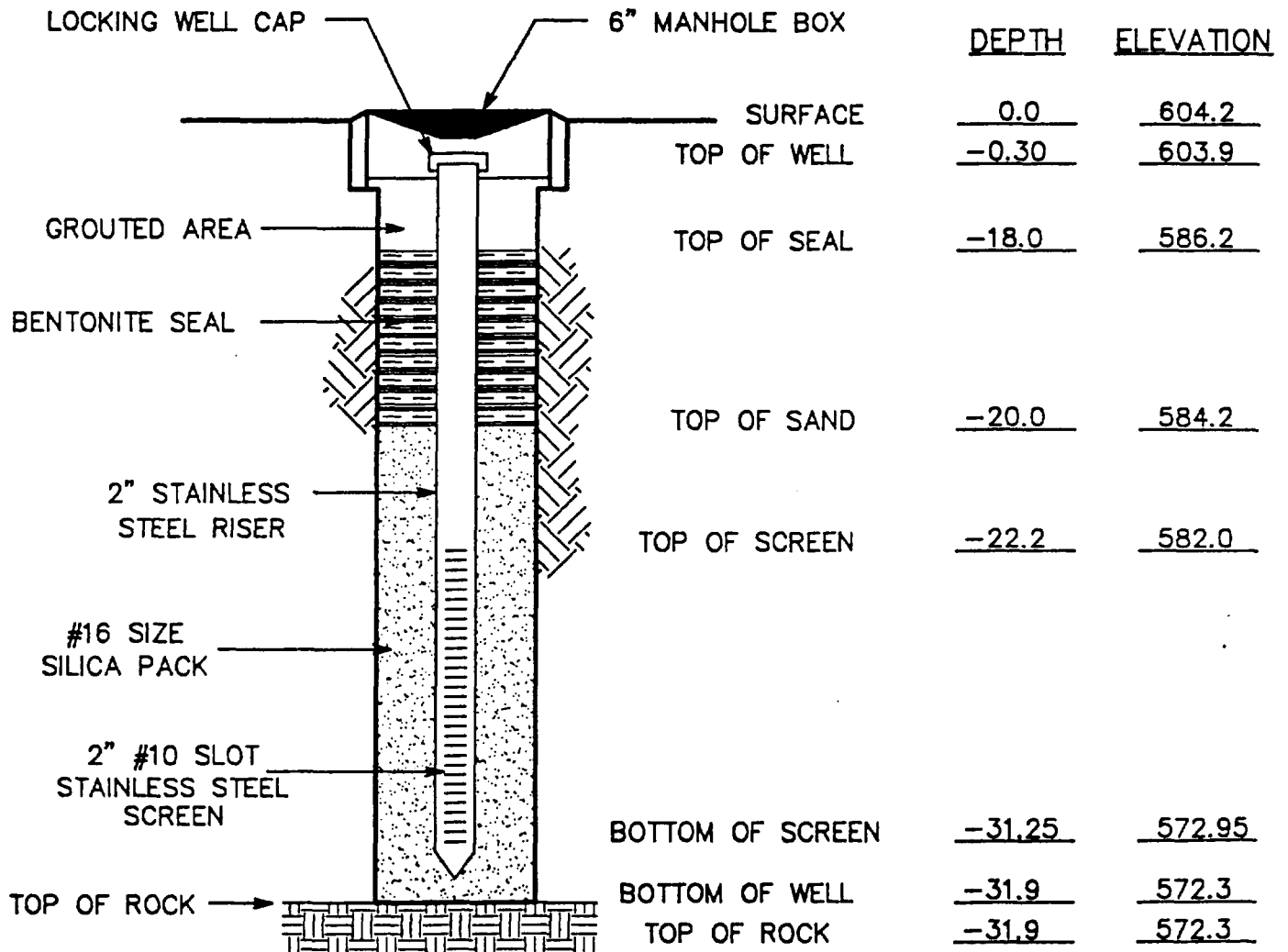
DUE TO THE NATURE OF THE SAMPLE MATRIX, MATRIX SPIKE/MATRIX SPIKE  
DUPLICATE ANALYSIS CANNOT BE PERFORMED FOR AIR ANALYSIS.

LP = LEVERNE PETERSON	RW = RITA WINGO
DWB = DAVID BOWERS	LD = LARRY DILMORE
DB = DENNIS BESON	LL = LANCE LARSON
RB = RAFAEL BARRAZA	JA = JENNIFER ALEXANDER
PL = PAUL LESCHENSKY	



**APPENDIX 4**  
**WELL LOGS**

# MONITORING WELL MW-3

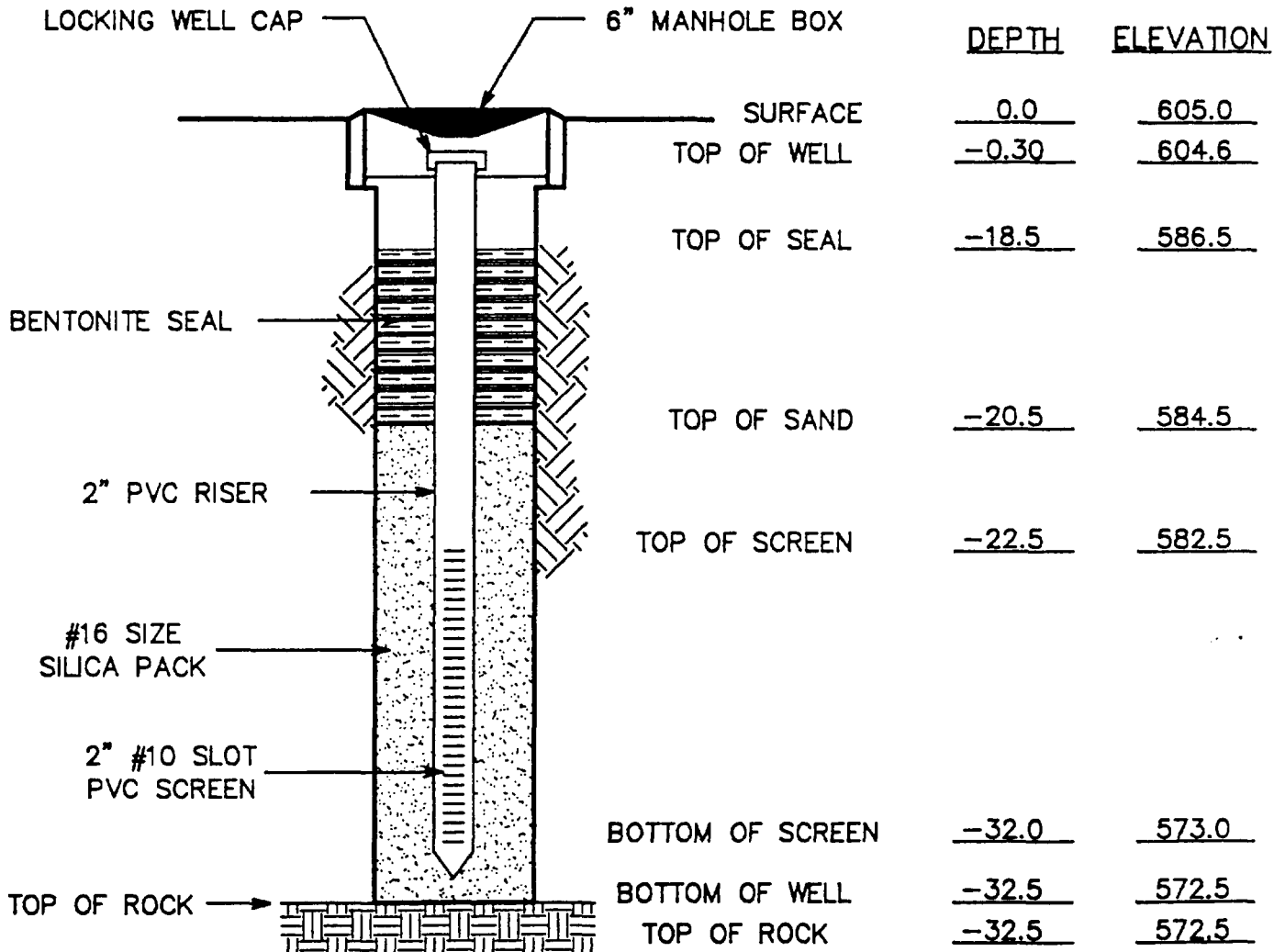


INSTALLATION DATE APRIL 18, 1994

NOT TO SCALE

CSX RADNOR YARD BERM  
NASHVILLE, TENNESSEE

# MONITORING WELL MW-RCI-2S



INSTALLATION DATE APRIL 18, 1994

NOT TO SCALE

CSX RADNOR YARD BERM  
NASHVILLE, TENNESSEE

1667

## LOG OF BORING NO. 2A

# OGDEN

**SHEET 1 OF 1**

## ENVIRONMENTAL AND ENERGY SERVICES

**PROJECT: CSX RADNOR YARD**

DRILLER: Larry DeMoss

PROJECT NO. 3-4162-3000-0003

**DATE: 9-8-94**

**HELPER:** George Lawrence

**BORING LOCATION:** Saad Site, east of main track

DRILLED FOR: CSX TRANSPORTATION

toe of berm, accessed from Franklin Brick

**RIG: MUD BUG**

**SURFACE ELEVATION: 592**

REFUSAL DEPTH 8.0

ELEV 586

FOOTAGE SAMPLED: 8.0

**TOP OF ROCK**

DEPTH 8.0

ELEV 586

**BEGAN CORING**

DEPTH N/A

**ELEV**

FOOTAGE CORED                      NONE

**BOTTOM OF HOLE DEPTH: 8.0**

ELEV 586

(X) A - POWER AUGER ( ) W - WASHBORED ( ) C - ROLLER CONE ( ) R - AIR ROTARY

[illegible]

SS - SPLIT-SPOON SAMPLE

UD - UNDISTURBED SAMPLE

## LOG OF BORING NO. 2B

**OGDEN**

**SHEET 1 OF 1**

## ENVIRONMENTAL AND ENERGY SERVICES

PROJECT: CSX RADNOR YARD		DRILLER: Larry DeMoss
PROJECT NO. 3-4162-3000-0003	DATE: 9-8-94	HELPER: George Lawrence
BORING LOCATION: Saad Site, east of main track		DRILLED FOR: CSX TRANSPORTATION
toe of berm, accessed from Franklin Brick		RIG: MUD BUG
SURFACE ELEVATION: 592		
REFUSAL DEPTH	9.5	ELEV 582.5
FOOTAGE SAMPLED: 9.5		
TOP OF ROCK	DEPTH 9.5	ELEV 582.5
BEGAN CORING	DEPTH N/A	ELEV
FOOTAGE CORED NONE		
BOTTOM OF HOLE DEPTH: 9.5		ELEV 582.5

(X) A - POWER AUGER ( ) W - WASHBORED ( ) C - ROLLER CONE ( ) R - AIR ROTARY

[illegible]

SS - SPLIT-SPOON SAMPLE  
UD - UNDISTURBED SAMPLE

## LOG OF BORING NO. 2S

OGDEN

SHEET 1 OF 1

ENVIRONMENTAL AND ENERGY SERVICES

PROJECT: CSX RADNOR YARD

DRILLER: MILLER DRILLING CO.

PROJECT NO. 3-4162-3000-0001

DATE: 8-25-94

HELPER:

BORING LOCATION: Saad Site, west of main track

DRILLED FOR: RCI, Mike Fortunado

RIG:

SURFACE ELEVATION 605.0

REFUSAL DEPTH 32.5

ELEV 572.5

FOOTAGE SAMPLED: 32.5

TOP OF ROCK DEPTH 32.5

ELEV 572.5

BEGAN CORING DEPTH N/A

ELEV N/A

FOOTAGE CORED NONE

BOTTOM OF HOLE DEPTH: 32.5

ELEV 572.5

( ) A - POWER AUGER ( ) W - WASHBORED (X) C - ROLLER CONE ( ) R - AIR ROTARY

SAMPLE NO. PULL NO.	DEPTH FROM TO	SET 6" RAN	2ND 6" REC'D	3RD 6" GAIN/ LOSS	ppQu (lbf) VALUE	T Y P E	CLASSIFICATION OF MATERIAL AND REMARKS
	0.0 - 3.0					C	GRAVEL (BALLAST) (fill)
1	3.0 - 5.0	24"	18"	-6"	2.5	SS	CLAY, Silty, light-brown, soft to firm, moist (fill)
	5.0 - 8.5					C	CLAY, Silty, light-brown, soft to firm, moist (fill)
2	8.5 - 9.0	24"	2"	-22"	0.25	SS	COBBLES, Clayey, Silty, brown, Very dense (fill)
	9.0 - 15.0					C	COBBLES, Clayey, Silty, brown, Very dense (fill)
	15.0 - 18.0					C	BOULDERS, very dense (fill)
3	18.0 - 20.0	24"	2"	-22"	N/A	SS	CINDERS, black, dense (fill)
	20.0 - 25.0					C	BOULDERS, very dense (fill)
4	25.0 - 27.0	24"	24"	0"	3.5	SS	CLAY, Silty, brown, stiff to very stiff
	27.0 - 32.5					C	CLAY, Silty, brown, stiff to very stiff
							Refusal Encountered at 32.5 feet
							(Set 2" PVC Well to 32.5 Feet w/ 10' Screen)

SS - SPLIT-SPOON SAMPLE

UD - UNDISTURBED SAMPLE

## LOG OF BORING NO. MW3

OGDEN

SHEET 1 OF 1

ENVIRONMENTAL AND ENERGY SERVICES

PROJECT: CSX RADNOR YARD

DRILLER: Larry DeMoss

PROJECT NO. 3-4162-3000-0003

DATE: 9-8-94

HELPER: George Lawrence

BORING LOCATION: Saad Site, east of main track

DRILLED FOR: CSX TRANSPORTATION

top of berm

RIG: MUD BUG

SURFACE ELEVATION: 604.7

REFUSAL DEPTH 31.9

ELEV 572.8

FOOTAGE SAMPLED: NONE

TOP OF ROCK

DEPTH 31.9

ELEV 572.8

BEGAN CORING

DEPTH N/A

ELEV N/A

FOOTAGE CORED NONE

BOTTOM OF HOLE DEPTH: 31.9

ELEV 572.8

(X) A - POWER AUGER ( ) W - WASHBORED ( ) C - ROLLER CONE ( ) R - AIR ROTARY

SAMPLE NO. PULL NO.	DEPTH FROM TO	SET 6" RAN	2ND 6" REC'D	3RD 6" GAIN/ LOSS	N VALUE	T Y P E	CLASSIFICATION OF MATERIAL AND REMARKS
	0.0 - 3.0					A	GRAVEL and slag, (BALLAST)(fill)
	3.0 - 5.0					A	GRAVEL and trace clay, silty, brown, (fill)
	5.0 - 6.0					A	BOULDER, (fill)
	6.0 - 8.0					A	GRAVEL, (fill)
	8.0 - 9.5					A	BOULDER, (fill)
	9.5 - 18.0					A	CLAY, silty, brown, w/ gravel, (fill)
	18.0 - 24.0					A	COBBLES and clay, silty, brown mixed (fill)
	24.0 - 25.5					A	BOULDER, (fill)
	25.5 - 31.9					A	CLAY, silty, brown
							Refusal Encountered at 31.9 feet.
							Water at 28.9' after 12 hours.
							Set 2" stainless steel well casing, w/ 10 screen, at
							31.9 feet (see well log)

SS - SPLIT-SPOON SAMPLE

UD - UNDISTURBED SAMPLE

## LOG OF BORING NO. 3A

OGDEN

SHEET 1 OF 1

ENVIRONMENTAL AND ENERGY SERVICES

PROJECT: CSX RADNOR YARD

DRILLER: Larry DeMoss

PROJECT NO. 3-4162-3000-0003

DATE: 9-9-94

HELPER: George Lawrence

BORING LOCATION: Saad Site, east of main track

DRILLED FOR: CSX TRANSPORTATION

top of berm

RIG: MUD BUG

SURFACE ELEVATION: 604.5

REFUSAL DEPTH 34.5

ELEV 570.0

FOOTAGE SAMPLED: 34.5

TOP OF ROCK

DEPTH 34.5

ELEV 570.0

BEGAN CORING

DEPTH N/A

ELEV N/A

FOOTAGE CORED NONE

BOTTOM OF HOLE DEPTH: 34.5

ELEV 570.0

(X) A - POWER AUGER ( ) W - WASHBORED ( ) C - ROLLER CONE ( ) R - AIR ROTARY

SAMPLE NO. PULL NO.	DEPTH FROM TO	SET 6" RAN	2ND 6" REC'D	3RD 6" GAIN/ LOSS	N VALUE	T Y P E	CLASSIFICATION OF MATERIAL AND REMARKS
	0.0 - 3.0					A	SLAG, black, w/gravel, (fill)
	3.0 - 5.0					A	CLAY, silty, brown, (fill)
1	5.0 - 6.5	1	7	9	16	SS	CLAY, silty, brown, w/gravel, firm (fill)
	6.5 - 10.0					A	CLAY, silty, brown, w/gravel, (fill)
2	10.0 - 11.5	1	3	4	7	SS	CLAY, silty, brown, w/gravel, soft (fill)
	11.5 - 15.0					A	CLAY, silty, brown, w/ gravel, (fill)
3	15.0 - 16.5	3	3	2	5	SS	CLAY, silty, brown, w/gravel, very soft (fill)
	16.5 - 20.0					A	CLAY, silty, brown, w/gravel, (fill)
4	20.0 - 21.5	1	2	1	3	SS	CLAY, silty, brown, w/gravel, very soft (fill)
	21.5 - 25.0					A	CLAY, silty, brown, w/gravel, (fill)
1	25.0 - 27.0	24"	17"	-7"		UD	CLAY, silty, brown,
5	27.0 - 28.5	4	5	7	12	SS	CLAY, silty, brown, stiff
	28.5 - 30.0					A	CLAY, silty, brown,
2	30.0 - 32.0	28"	28"	0		UD	CLAY, sandy, silty, gray-brown,
6	32.0 - 33.5	3	3	5	8	SS	CLAY, sandy, silty, gray-brown, firm
	33.5 - 34.5					A	CLAY, sandy, silty, gray-brown, Refusal Encountered at 34.5 feet

SS - SPLIT-SPOON SAMPLE UD - UNDISTURBED SAMPLE



**APPENDIX 5**  
**DRAWINGS**

**OVERSIZED**

**DOCUMENT**

3.